SERVICE MANUAL
Aktilite® CL128
Ver 1.3

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SERVICE MANUAL

Aktilite® CL128

Any kind of service should only be carried out by authorised personnel.
Refer to the User Manual for further information regarding safety and precautions.

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This service manual is primarily meant for mechanical repairs and covers both Aktilite® CL128 lamps with fixed and detachable lamp head.

The electronic control board in the lamp head has to be programmed with the parameters to match the calibrated light module. If the electronic control board is faulty then the complete board is changed and programmed with the original parameters for the light module. These can only be retrieved from the Device History Record for the lamp kept at the factory and entering the device factory programming mode can only be done by trained service personnel. The light module consist of led arrays, heat sink and lenses. If a led diode is faulty then the complete light module is changed.

If a power supply electronics board is faulty, a new tested power supply can be obtained from Photocure. However, this has to be tested for leakage current, earth continuity and withstanding voltage test by qualified personnel.

1 Assembly of Aktilite CL128 Lamp with Parallel Arm

1.1 Material/Equipment

1.1.1 Tools needed for the assembly of lamp with fixed lamp head

Required tools

# of items	Description
1	Screwdriver, Pozidrive 1
1	Screwdriver, Pozidrive 2
1	Screwdriver, Torx T 7
1	Screwdriver, Torx T 10
1	Screwdriver, Torx T 20

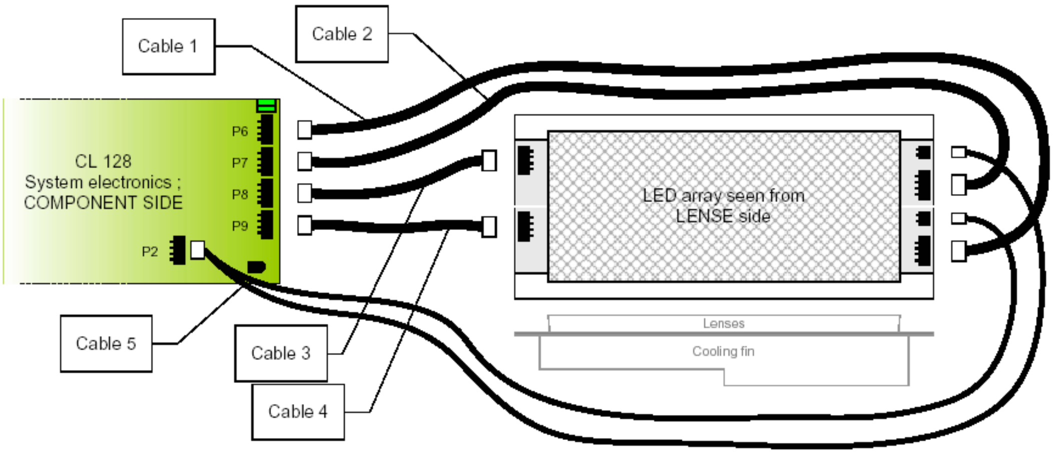
1.1.2 Tools needed for the assembly of lamp with detachable lamp head

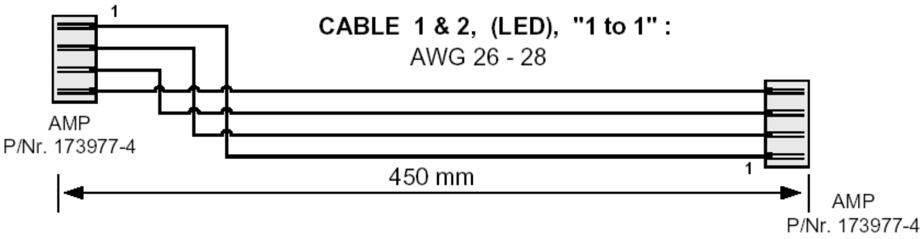
Required tools

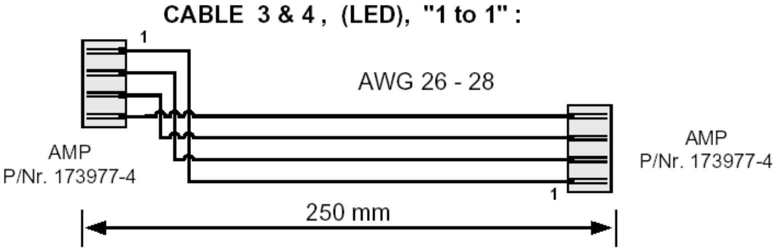
# of items	Description
1	Screwdriver, Pozidrive 1
1	Screwdriver, Pozidrive 2
1	Screwdriver, Torx T 10
1	Screwdriver, Torx T 15
1	Screwdriver, Torx T 20
1	Allen key, 5mm Umbraco
1	Press nut tool
1	Crimping tool LEMO DPC.91-701V
1	Locator male DCE.91.135.BVC
1	Locator female DCE.91.130.BVM
1	Extraction tool LEMO DCF.91.133.5LT

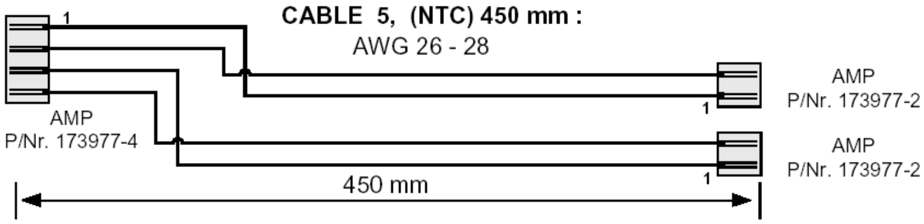
1.2 Ready Tested System Electronics Module (128-0-439) assembly

LED connection cables CL128


Cable 1
Cable 2
CL 128
System electronics ;
COMPONENT SIDE
P6
P7
P8
P9
P2
LED array seen from
LENSE side
Lenses
Cooling fin
Cable 5
Cable 3
Cable 4


CABLE 1 & 2, (LED), "1 to 1" :
AWG 26 - 28
1
AMP
P/Nr. 173977-4
1
450 mm
AMP
P/Nr. 173977-4

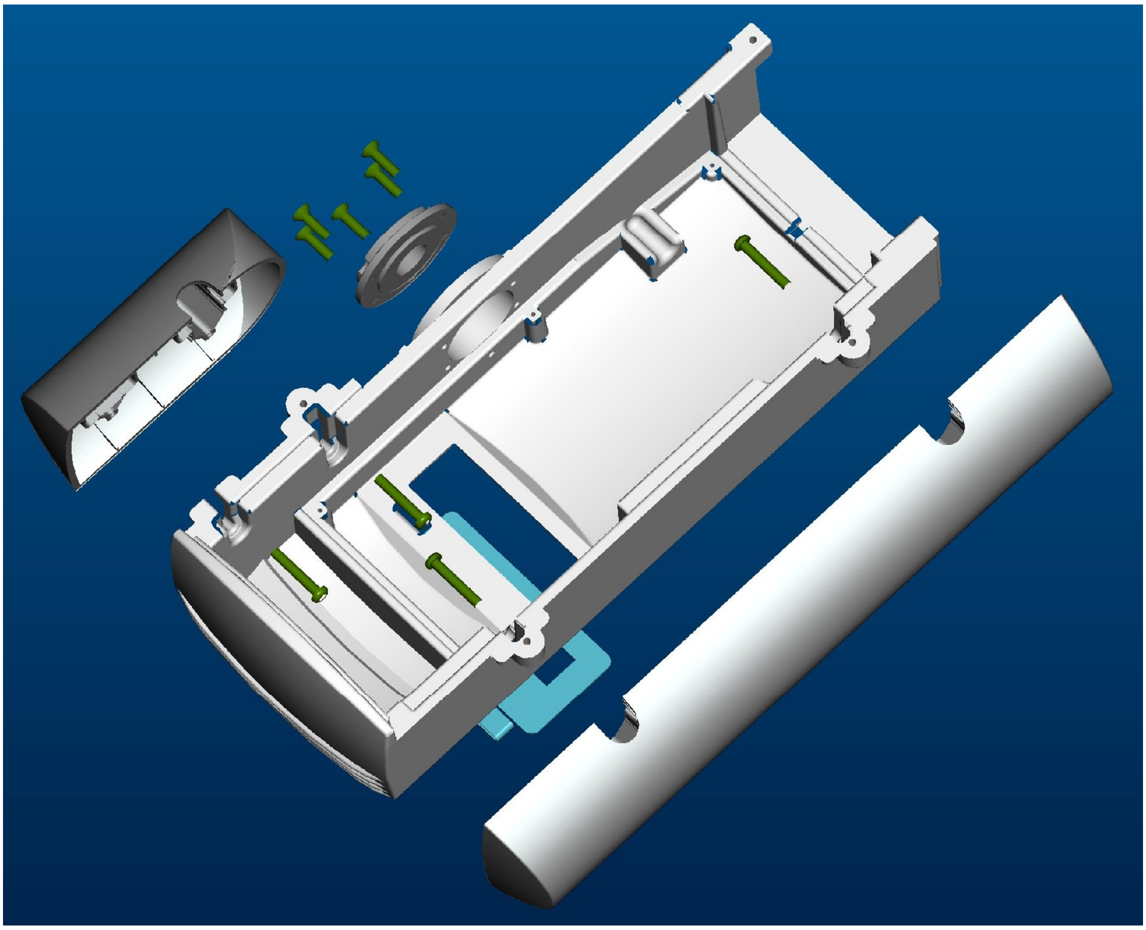

CABLE 3 & 4 , (LED), "1 to 1" :
1
AWG 26 - 28
AMP
P/Nr. 173977-4
AMP
P/Nr. 173977-4
1
250 mm


CABLE 5, (NTC) 450 mm :
AWG 26 - 28
1
AMP
P/Nr. 173977-4
1
AMP
P/Nr. 173977-2
1
AMP
P/Nr. 173977-2
450 mm

1.3 Housing top module (128-0-610) assembly

Required items

Part #	# of items	Description
128-0-978	1	Housing top (moulded plastic)
128-1-637	1	Housing top slide bearing
128-1-932	5	Screw – PT4x16 countersunk
128-1-626	1	Housing right (moulded plastic)
128-1-628	1	Housing left (moulded plastic)
128-1-931	4	Screw – PT4x25
128-1-636	1	User interface (foil keyboard w/tail)
		Rubbing alcohol (fat free)



Assembly description

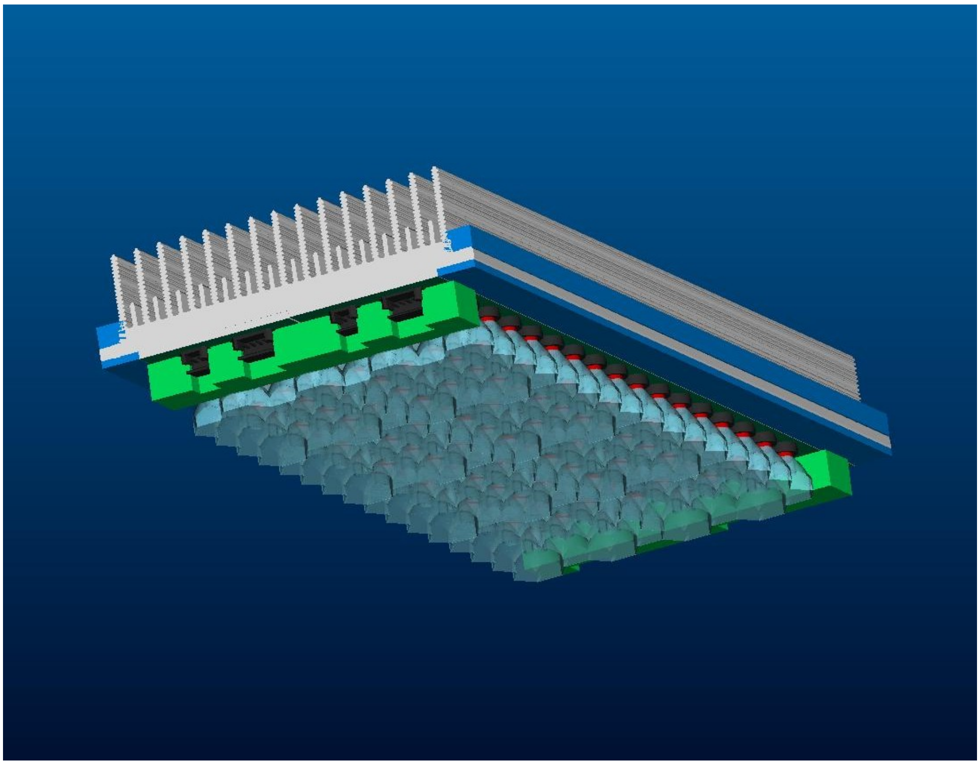
Step 1) Assemble the housing top slide bearing (128-1-637) to the housing top (128-0-978) using the five countersunk PT4x16 screws (128-1-932).

Step 2) Assemble the housing left (128-1-628) and housing right (128-1-626) to the housing top (128-0-978) using the four PT4x25 screws (128-1-931).

Step 3) Clean the recessed area at the top of the housing top (128-0-978) using a cloth and rubbing alcohol

Step 4) Glue the Key Touch panel (128-1-636) to the housing top (128-0-978).

1.4 Light module (128-0-750)



This light module comes as a ready tested and calibrated part. The dose factor in the control electronics and currents (set in factoring mode) has to be adjusted according to the documentation following the specific light module. To determine the dose factor, comprehensive tests has to be done with spectrometer and radiometer so this can only be done at the factory. The dose factor is a factor that is a combination of wavelength and irradiance and will vary slightly from light module to light module.

1.5 Glue lenses

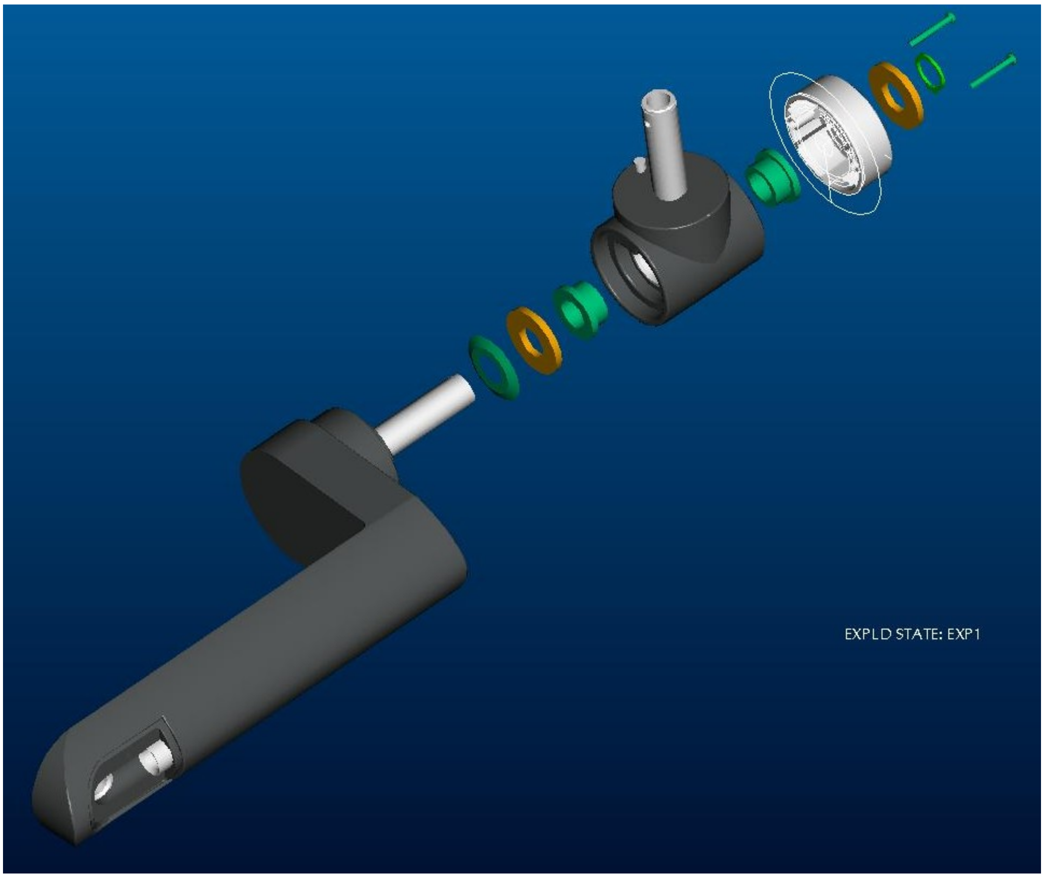
If one of the lenses is loose they can be glued on to the substrate using Loctite 435 glue.

1.6 Positioning arm module (128-0-400) assembly

1.6.1 Fixed lamp head

Required items

Part #	# of items	Description
128-0-437	1	T-piece (Moulded plastic)
128-1-910	2	Plastic bearings
128-0-428	1	Main arm (Moulded plastic)
128-1-914	2	Aluminium washers
128-1-912	1	Conical spring
128-1-916	1	Circlip
128-1-424	1	T-piece cover (Moulded plastic)
128-1-926	2	Screws – PT3x25



Assembly description

Step 1) Press the two plastic bearings (128-1-910) into the T-piece (128-0-437). (Specially made tool is necessary for this or a jig made by Kitron.)

Step 2) Slide conical spring (128-1-912) onto aft tube of the main arm (128-0-428), The pointed end of the conic spring (128-1-912) goes towards the plastic of the main arm (128-0-428).

Step 3) Assemble one aluminium washer (128-1-914) and the T-piece (128-0-437) (Including the already assembled plastic bearings (128-1-910)).

Step 4) Compress the conical spring (128-1-912) by holding the T-piece (128-1-437) tightly against the main arm (128-1-428). (This compression and holding can be done with one hand.)

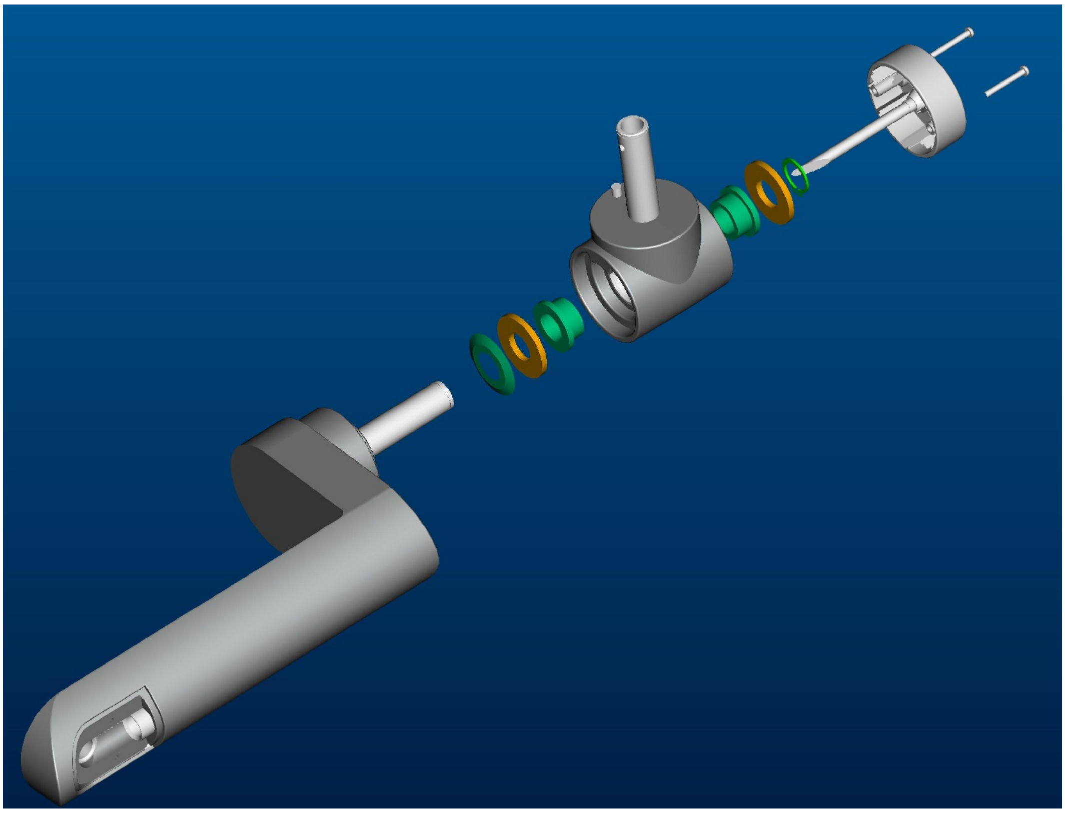
Step 5) Assemble another aluminium washer (128-1-914) and circlip (128-1-916). Make sure that the Circlip is well located in the groove.

Step 6) Assemble T-piece cover (128-1-424) using the two PT3x25 screws (128-1-926).

1.6.2 Detachable lamp head

Required Items

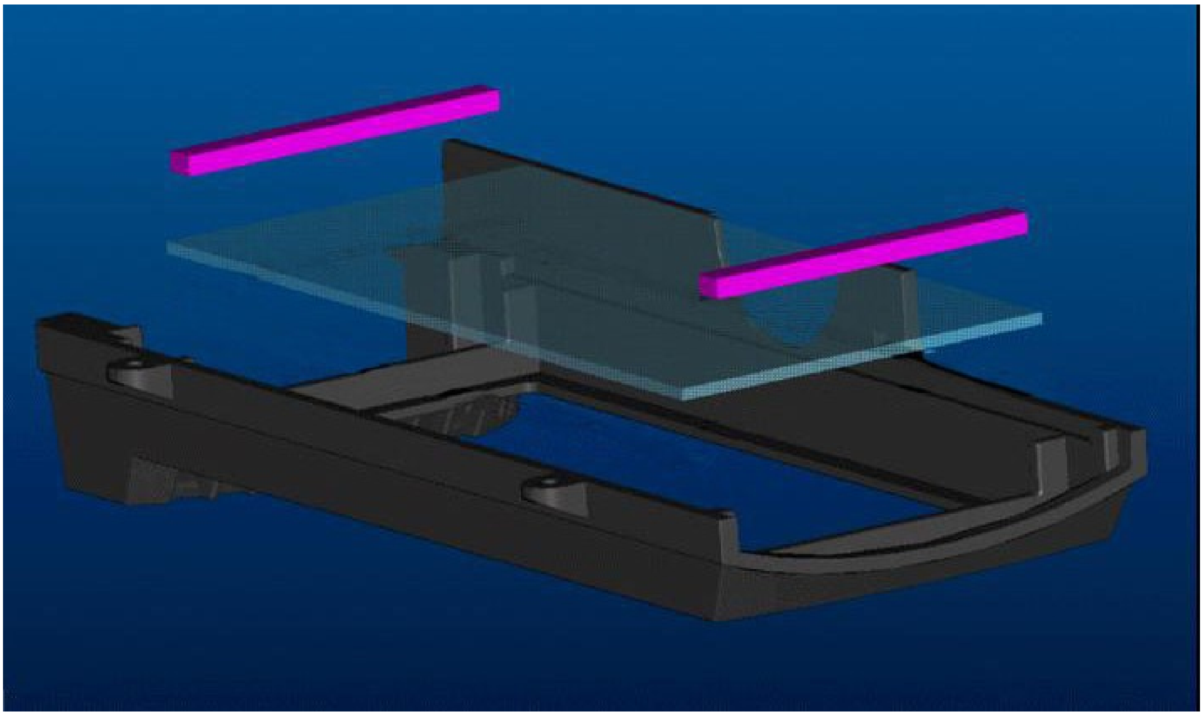
Part #	# of items	Description
128-0-437	1	T-piece (Moulded plastic)
128-1-910	2	Plastic bearing
128-0-428	1	Main arm (Moulded plastic)
128-1-914	2	Aluminium washer
128-1-912	1	Conical spring
128-1-916	1	Circlip
128-0-988	1	Cable from system electronics to lamp head connector
128-1-926	2	Screw – PT3x25



Assembly description

Step 1) Press the two plastic bearings (128-1-910) into the T-piece (128-0-437). (Specially made tool is necessary for this or a jig made by Kitron.)
Step 2) Broach the plastic bearings to Ø16,2mm after insertion in T-piece
Step 3) Slide conical spring (128-1-912) onto aft tube of the main arm (128-0-428), The pointed end of the conic spring (128-1-912) goes towards the plastic of the main arm (128-0-428).
Step 4) Assemble one aluminium washer (128-1-914) and the T-piece (128-0-437) (Including the already assembled plastic bearings (128-1-910)).
Step 5) Compress the conical spring (128-1-912) by holding the T-piece (128-0-437) tightly against the main arm (128-1-428). (This compression and holding can be done with one hand.)
Step 6) Assemble another aluminium washer (128-1-914) and circlip (128-1-916). Make sure that the Circlip is well located in the groove.
Step 7) Assemble power cable assembly (128-0-988) by inserting the cable thru the positioning arm module (128-0-400).
Step 8) Put in the cord and fasten the T-piece cover (128-1-424) in the power cable assembly (128-0-988) using the two PT3x25 screws (128-1-926).

1.7 Housing bottom module (128-0-820)



The housing bottom comes fully assembled as a spare part.
Clean the glass if necessary before final assembly.

1.8 Housing back module (128-0-810) assembly

Required items

Part #	# of items	Description
128-1-812	1	Housing back (Moulded plastic)
128-1-905	1	Fan
128-1-814	4	Screws M4x10 (DIN 7985)
128-1-815	4	Washers

Assembly description

Step 1) Place the fan (128-1-905) in the recess of the back housing (128-1-812) and mount the fan using the four M4x10 screws (128-1-814) and the four washers (128-1-815). The fan cable must face upwards relative to the housing back (128-1-812). (The housing back is wider at the top than at the bottom)

1.9 Lamp head module (128-0-200) assembly

- see slide series inm Chapter 1.9.3.

1.9.1 Fixed lamp head

Required items

Part #	# of items	Description
128-0-610	1	Housing top module
128-0-400	1	Positioning arm module
128-1-914	2	Aluminium washers
128-1-912	1	Conic spring
128-1-916	1	Circlip
128-1-202	1	Power cable – From PS to lamp head *(fixed lamp head only)*
128-0-810	1	Housing back module
128-1-928	4	Screws – PT 4x30
128-0-439	1	System electronics module
128-1-921	6	Screws – PT 2,5x8
128-0-750	1	Light module
128-0-820	1	Housing bottom module
128-1-929	4	Screws – PT 4x10
128-1-890	1	Main arm mini cover (moulded plastic)
128-1-923	2	Screws – PT 3x10
128-1-945	1	Cable tension release *(fixed lamp head only)*

Assembly description

Step 1) Assemble position arm module (128-0-400) to housing top module (128-0-610) by sliding the short axle of the main arm (128-0-428) thru the housing top slide bearing (128-1-632).

Step 2) Slide an aluminium washer (128-1-914), a conical spring (128-1-912) and another aluminium washer (128-1-914) onto the short axle of the main arm (128-0-428) from the inside of the housing.

Step 3) Compress the conical spring (128-1-912) and assemble the circlip (128-1-916). This is easiest done with a special made tool (see pictures). Make sure that the circlip is located securely in the groove. This is very important.

Step 4) Assemble power cable (128-1-302) by inserting the cable thru the positioning arm module (128-0-400). Leave excess cable inside the lamp head to simplify assembly in a later step.

Step 5) Position housing back module (128-0-810) at the back end of the housing top module (128-0-610). Do not assemble with screws yet.

Step 6) Insert power cable (128-1-302) ends into appropriate receptors (cable marked 1 is plus [+], cable marked 2 is minus [-]), fan cable plug from housing back module (128-0-810) and tail from the user interface of the housing top module 128-0-610 into appropriate connectors on the system electronics module (128-0-439). Refer to cable spec from Kitron Development 06.03.2002: "LED cables CL128, Rev. A".

Step 7) Fasten the system electronics module (128-0-439) to the housing top module (128-0-610) using the six PT 2,5x8 screws (128-1-921). And pull out the excess power cable (128-1-302) from the lamp head.

Step 8) Plug the six cables from the system electronics module (128-0-439) into the appropriate connectors on the LED-panels (128-1-762) of the light module (128-0-750).

Step 9) Tidy the cables from the system electronics module (128-0-439) by inserting them thru the four miniature cable holders (128-1-944) on the light module (128-0-750).

Step 10) Seat the light module (128-0-750) properly in the housing top module (128-0-610).

Step 11) Remove the protective foil from the protective window (128-1-826) of the housing bottom module (128-0-820).

Step 12) Assemble the housing bottom module (128-0-820) to the housing top module (128-0-610) using the four PT 4x10 screws (128-1-929).

Step 13) Fasten the housing back module (128-0-820) to the rest of the lamp head using the four PT 4x30 screws (128-1-928).

Step 14) Assemble the main arm mini cover (128-1-890) to the positioning arm module (128-0-400) using the two PT 3x10 screws (128-1-923).

Step 15) Assemble the cable tension release (128-1-945) around the power cable (128-1-302) and inserting it into the T-piece cover (128-1-424) of the positioning arm module (128-0-400).

1.9.2 Detachable lamp head

Required items

Part #	# of items	Description
128-0-610	1	Housing top module
128-0-400	1	Positioning arm module
128-1-914	2	Aluminium washer
128-1-912	1	Conic spring
128-1-916	1	Circlip
128-0-810	1	Housing back module
128-1-928	4	Screw – PT-K 40x30 WN 1452
128-0-439	1	System electronics module
128-1-921	6	Screw – PT 2,5x8
128-0-750	1	Light module
128-0-820	1	Housing bottom module
128-1-929	4	Screw – PT 4x10
128-1-890	1	Main arm mini cover (moulded plastic)
128-1-923	2	Screw – PT 3x10

Assembly description

Step 1) Assemble position arm module (128-0-400) to housing top module (128-0-610) by sliding the short axle of the main arm (128-0-428) thru the housing top slide bearing (128-1-632).

Step 2) Slide an aluminium washer (128-1-914), a conical spring (128-1-912) and another aluminium washer (128-1-914) onto the short axle of the main arm (128-0-428), from the inside of the housing.

Step 3) Compress the conical spring (128-1-912) and assemble the circlip (128-1-916). This must be done with a special made tool. Similar to a large pair of channel locks, but with custom heads. Make sure that the circlip is located securely in the groove.

Step 4) Position housing back module (128-0-810) at the back end of the housing top module (128-0-610). Do not assemble with screws yet.

Step 5) Insert power cable (128-0-988) ends into appropriate receptors (cable marked 1 is plus [+], cable marked 2 is minus [-])

Step 6) Fan cable plug from housing back module (128-0-810) and tail from the user interface of the housing top module 128-0-610 shall be inserted into appropriate connectors on the system electronics module (128-0-439).

Step 7) Refer to PCU-010-128 for the connection of the cables going from the electronic control board to the LED arrays..

Step 8) Fasten the system electronics module (128-0-439) to the housing top module (128-0-610) using the six PT 2,5x8 screws (128-1-921). And pull out the excess power cable (128-1-302) from the lamp head.

Step 9) Plug the six cables from the system electronics module (128-0-439) into the appropriate connectors on the LED-panels (128-1-762) of the light module (128-0-750).

Step 10) Tidy the cables from the system electronics module (128-0-439) by inserting them thru the four miniature cable holders (128-1-944) on the light module (128-0-750).

Step 11) Seat the light module (128-0-750) properly in the housing top module (128-0-610).

Step 12) Remove the protective foil from the protective window (128-1-826) of the housing bottom module (128-0-820).

Step 13) Assemble the housing bottom module (128-0-820) to the housing top module (128-0-610) using the four PT 4x10 screws (128-1-929).

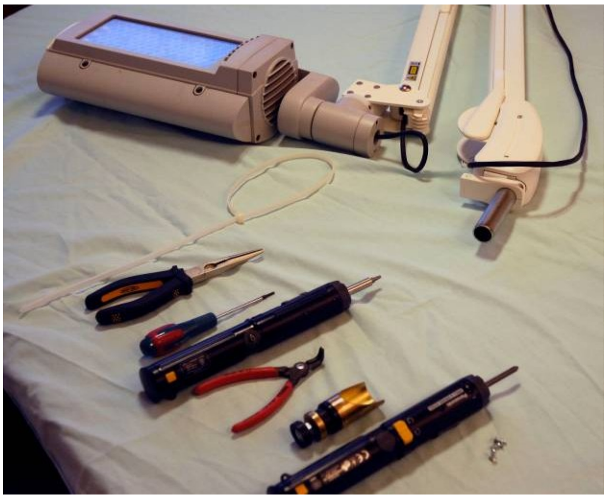
Step 14) Fasten the housing back module (128-0-810) to the rest of the lamp head using the four PT-K 40x30 screws (128-1-928).

Step 15) Assemble the main arm mini cover (128-1-890) to the positioning arm module (128-0-400) using the two PT 3x10 screws (128-1-923).

1.9.3 Disassemly and Assembly of the lamp – slide series

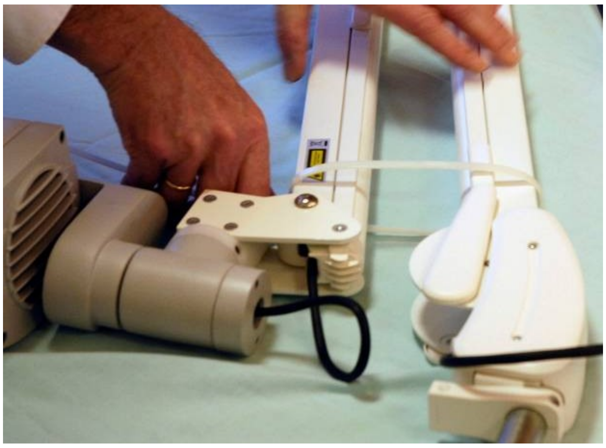
The lamp head module assembly slide series in this chapter is based on the Aktilite® CL128 with fixed lamp head. However, there are only minor differences between lamp head module assembly for fixed and detachable lamp head. The below slide series is therefore common for both lamp head variations.

Warning: The gas springs inside the arm is very powerful – therefore secure the arm with a strap



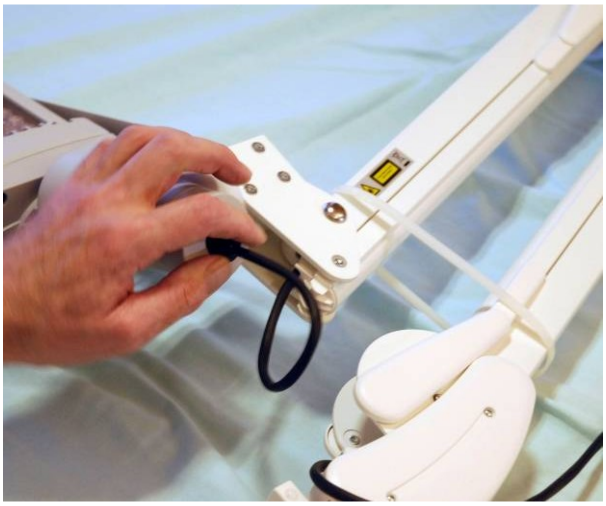
Required Tools:

- Nylon Strap length minimum 45 cm
- Pair of telephone pliers
- Circlip pliers for 16 mm circlip
- Torx T7 screwdriver
- Torx T10 screwdriver
- Torx T20 screwdriver
- Philips PH2 screwdriver
- Tool to compress the spring mechanism
- Allen key (5mm)



Step 1

Put on a strap or similar to secure the parallel arm.

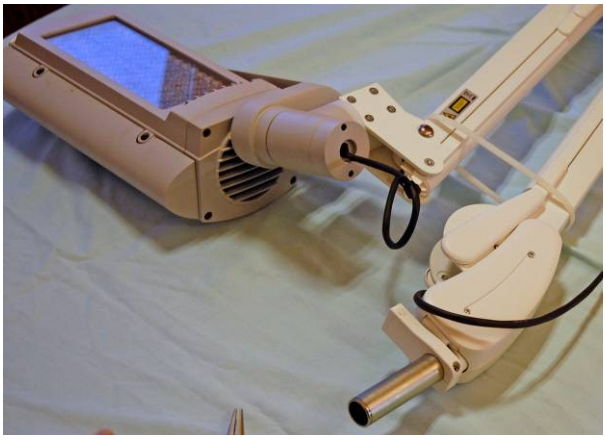


Step 2

Step 2-5 is only necessary if you need to take off the main arm, the housing or replace the cable.

Remove the strain relief (black) on the end of the main arm using a pair of pliers.

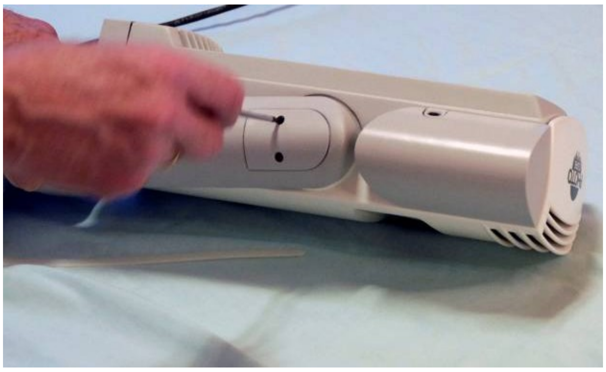
For lamps with detachable lamp head:
Disconnect the cable plug from the T-piece cover plug and detach the lamp head by removing the lamp head holder locking screw using the provided Allen key.



Step 3
Step 2-5 is only necessary if you need to take off the main arm, the housing or replace the cable.

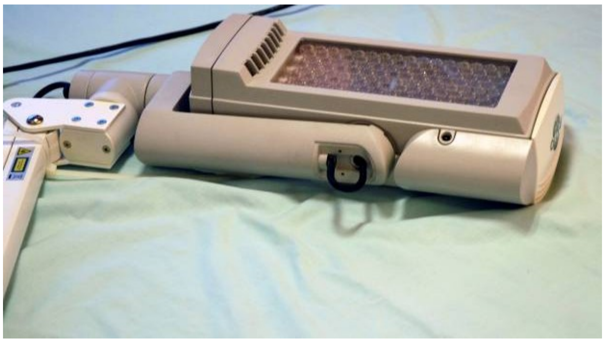
Remove the strain relief.

Not applicable for lamps with detachable lamp head



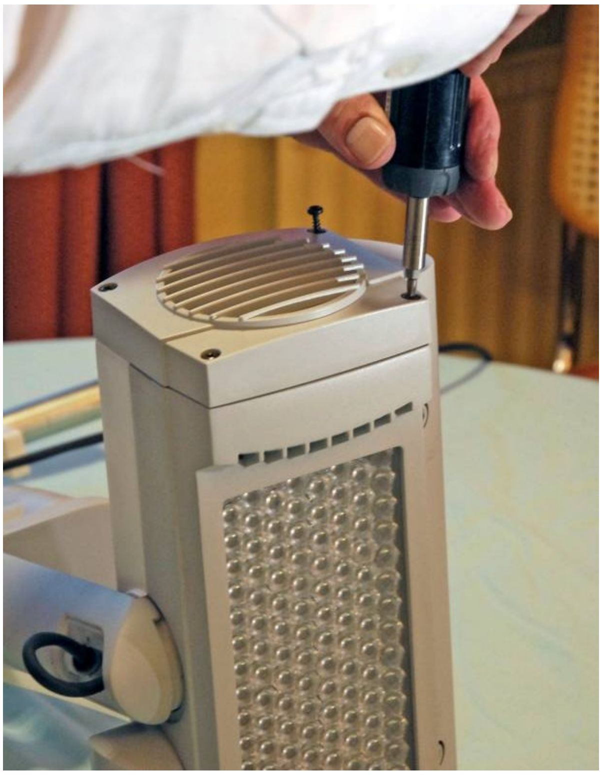
Step 4
Step 2-5 is only necessary if you need to take off the main arm, the housing or replace the cable.

Remove the small cover on the main arm using the T10 screwdriver



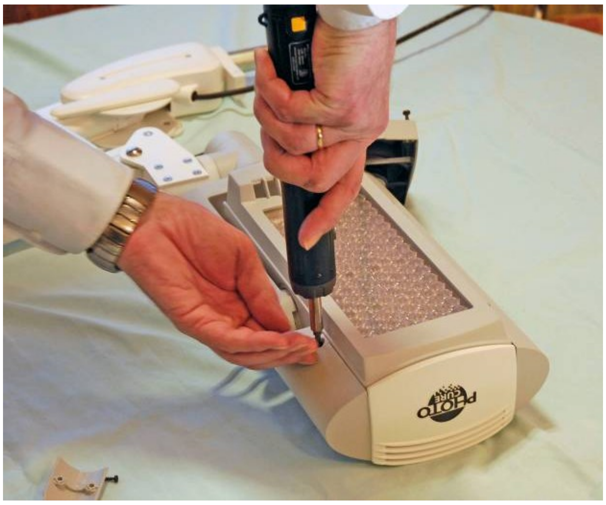
Step 5
Step 2-5 is only necessary if you need to take off the main arm, the housing or replace the cable.

Feed a few cm of cord through the arm to make a loop as shown.



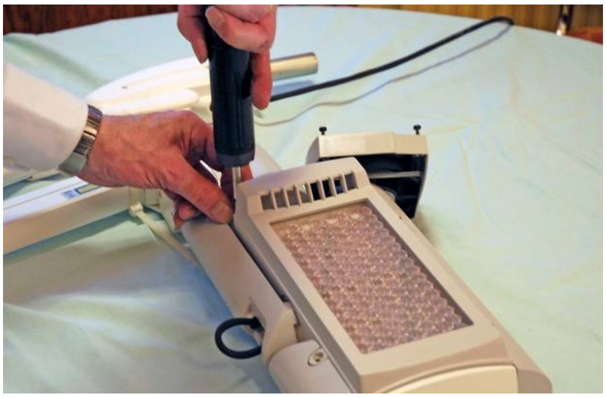
Step 6

Unscrew the fan housing using the T20 screwdriver. (4 Screws)



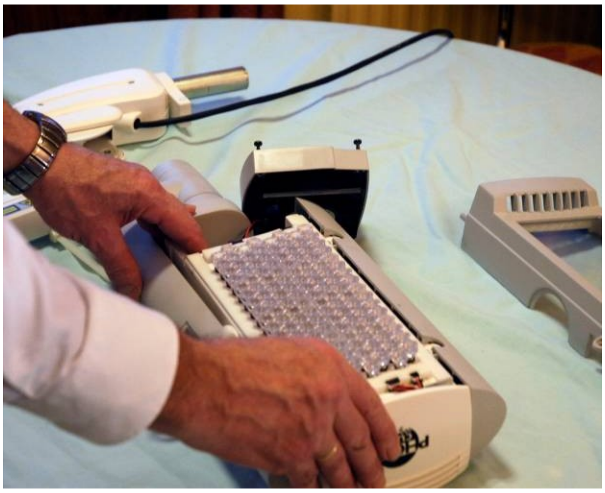
Step 7

Unscrew the housing bottom using the T20 screwdriver. (4 screws)



Step 8

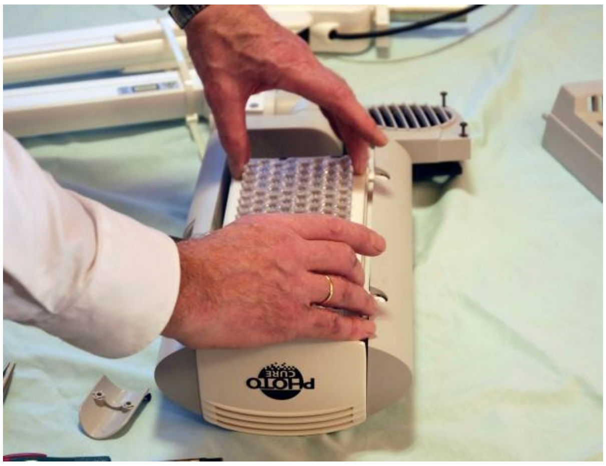
The last screw sits by the fan.



Step 9

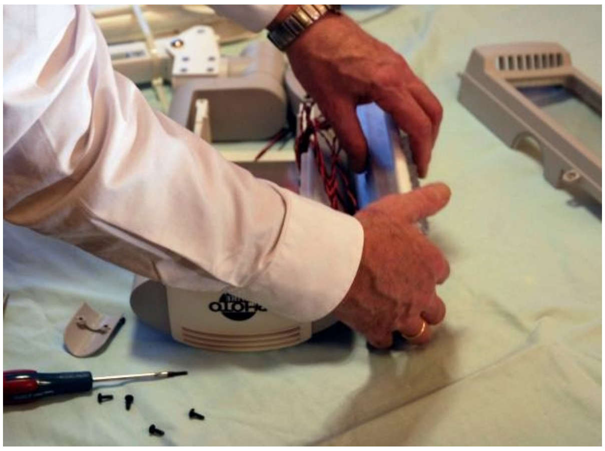
Carefully lift up the light module.

Do not lift by the lenses, but lift the heat sink.



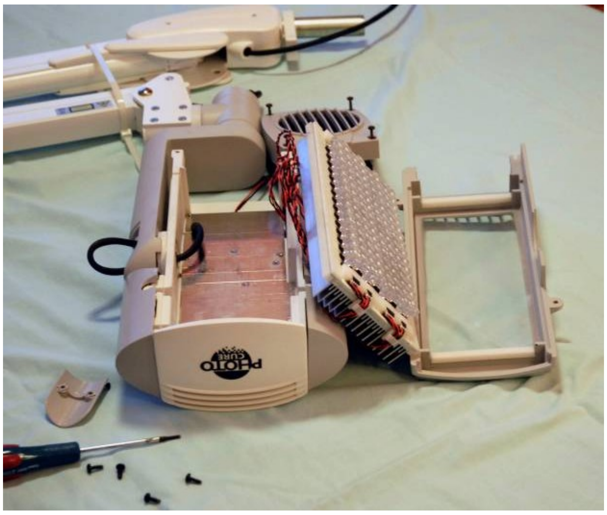
Step 10

Gently remove the light module.



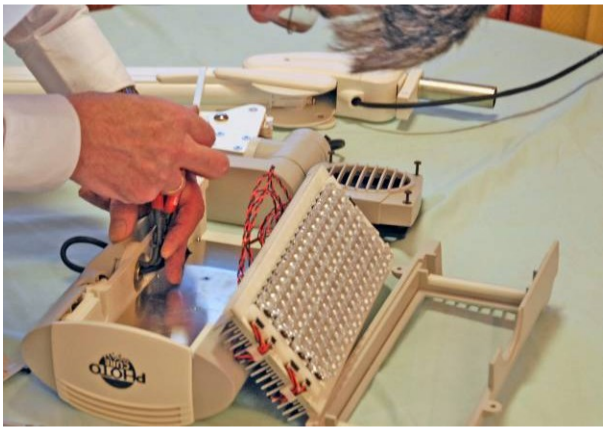
Step 11

Place the light module on the side of the housing.
Be careful with the leads.



Step12

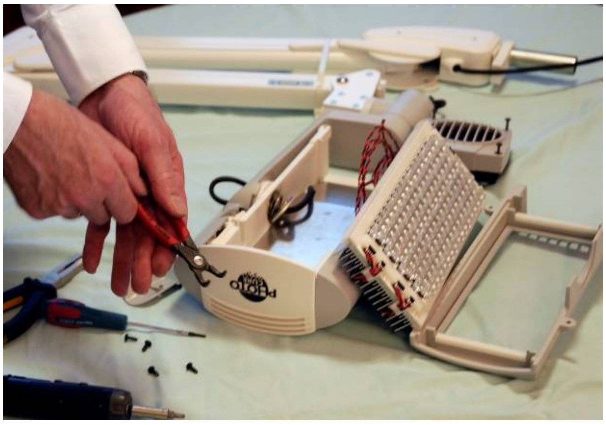
Put something underneath the light module to support it.



Step 13

Step 13 – 16 is only necessary if you need to change the main arm or the housing

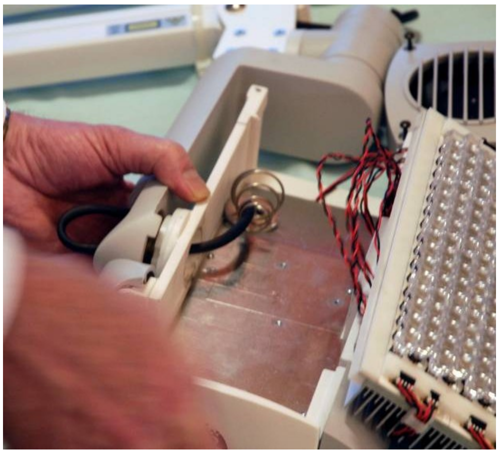
Use the circlip pliers to release the circlip.



Step 14

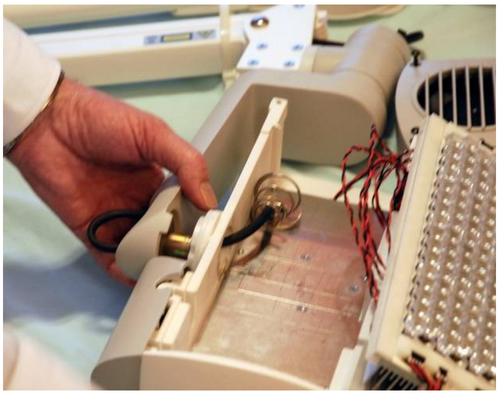
Step 13 – 16 is only necessary if you need to change the main arm or the housing

Circlip tool



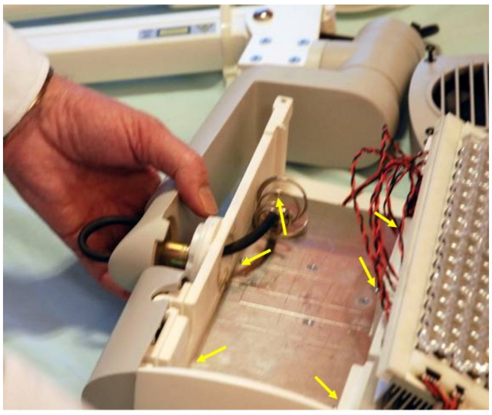
Step 15
Step 13 – 16 is only necessary if you need to change the main arm or the housing

Take off the washers and spring.



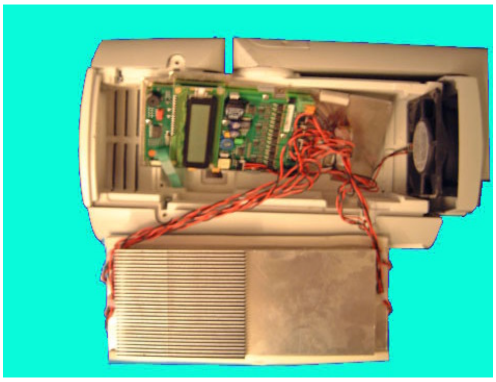
Step 16
Step 13 – 16 is only necessary if you need to change the main arm or the housing

Bring out the main arm



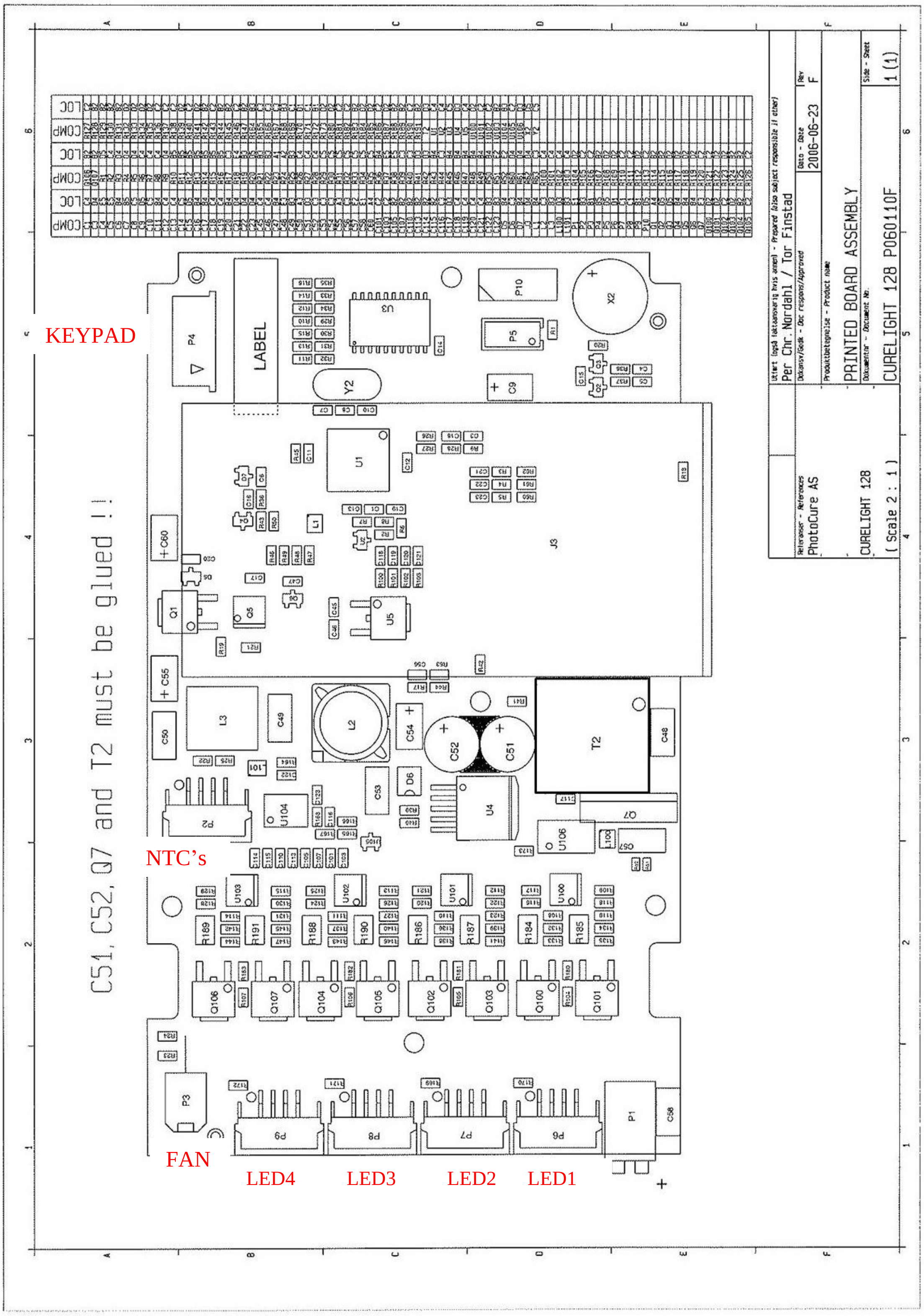
Step 17

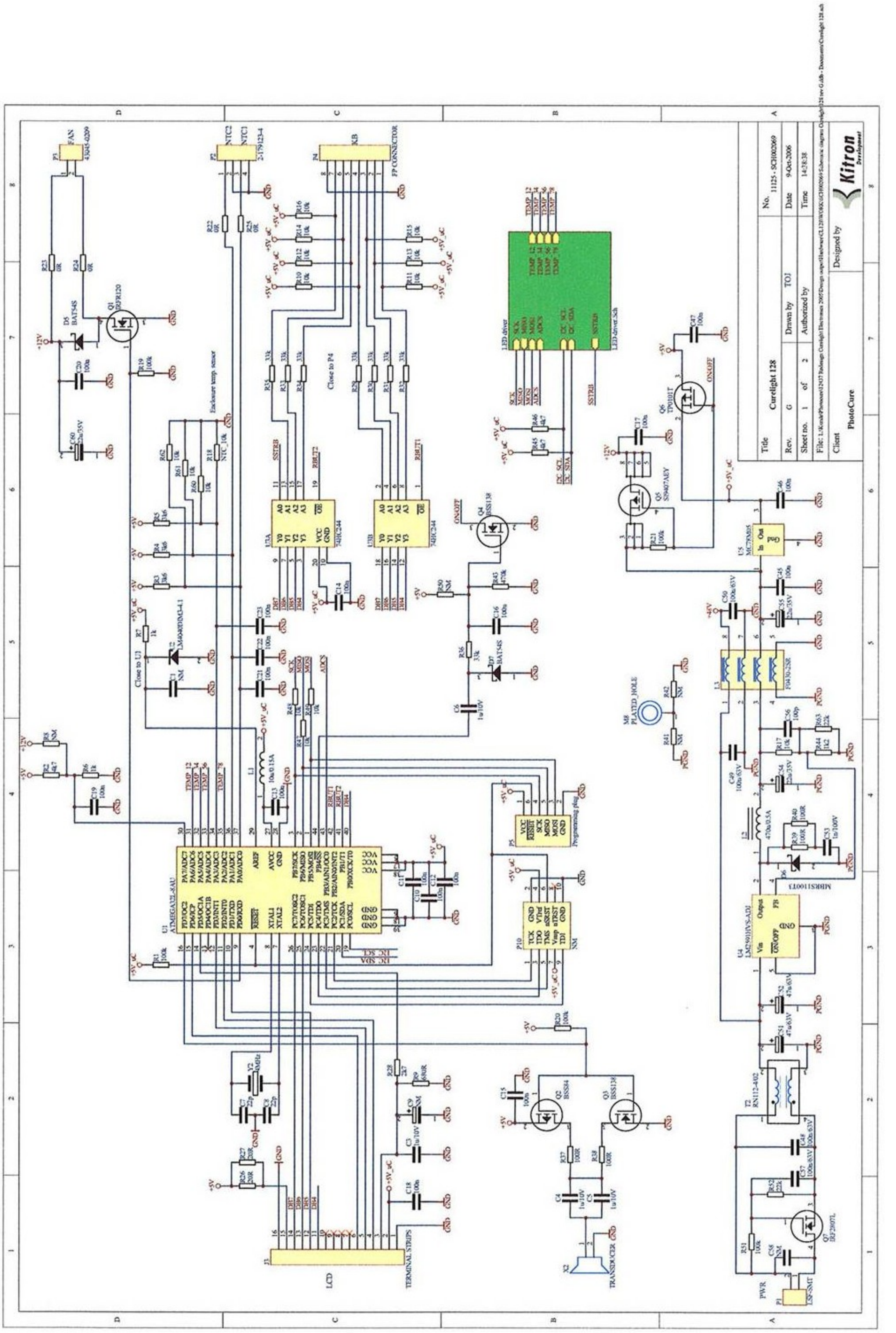
The control electronics is fastened with 6 Torx 0,7 screws – shown by the arrows.

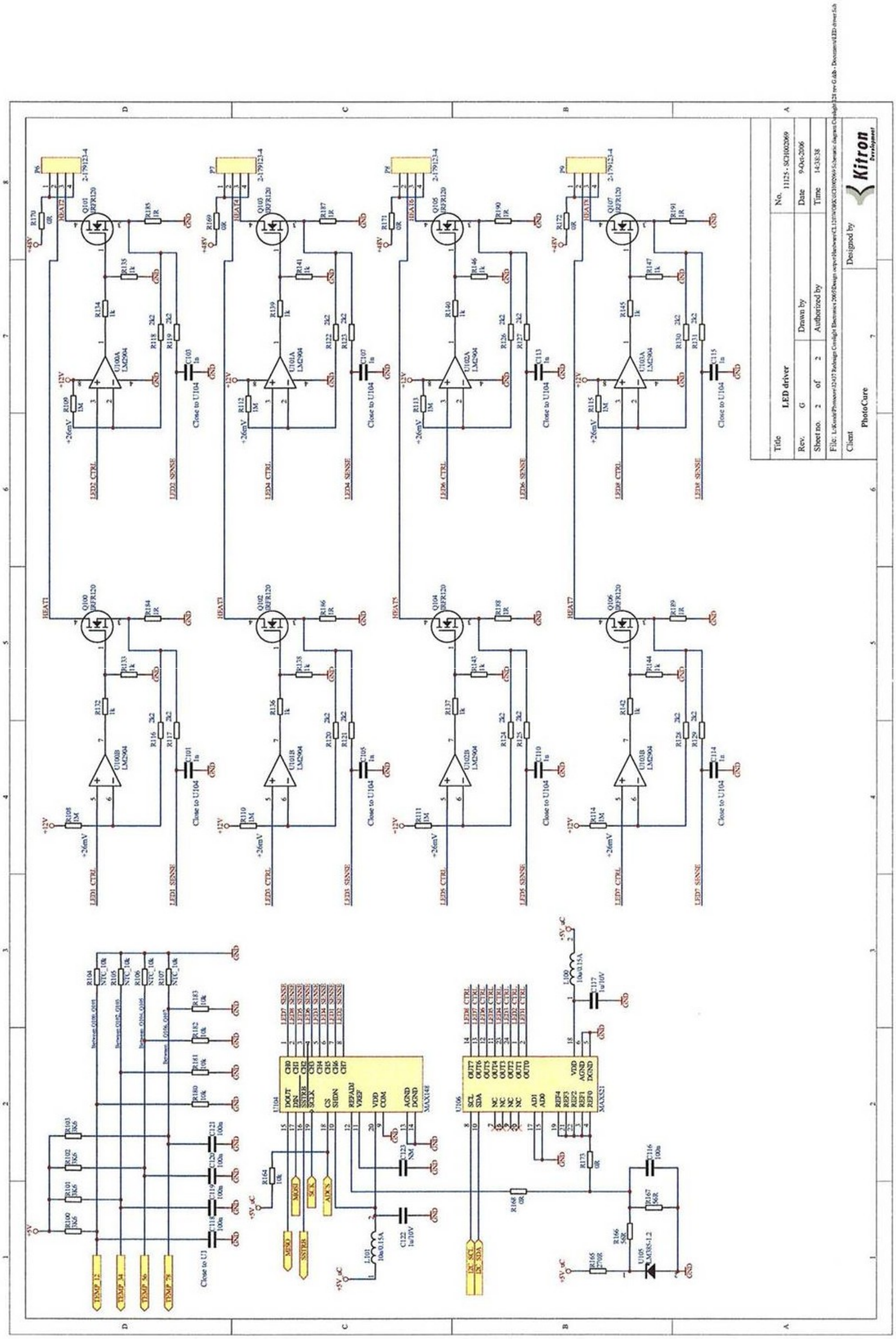


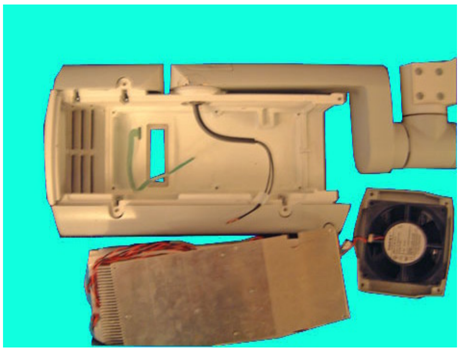
Step 18

The picture shows the electronics control board and its connections. Wiring can be found in chapter 1.2 “Ready tetst system electronics module (128-0-439) assembly” and on the next page.


KEYPAD
NTC’s
FAN
LED4
LED3
LED2
LED1
C51, C52, Q7 and T2 must be glued !!
Per Chr. Nordahl / Tor Finstad
2006-06-23
F
PhotoCure AS
PRINTED BOARD ASSEMBLY
CURELIGHT 128 P060110F
CURELIGHT 128
(Scale 2 : 1)
1 (1)

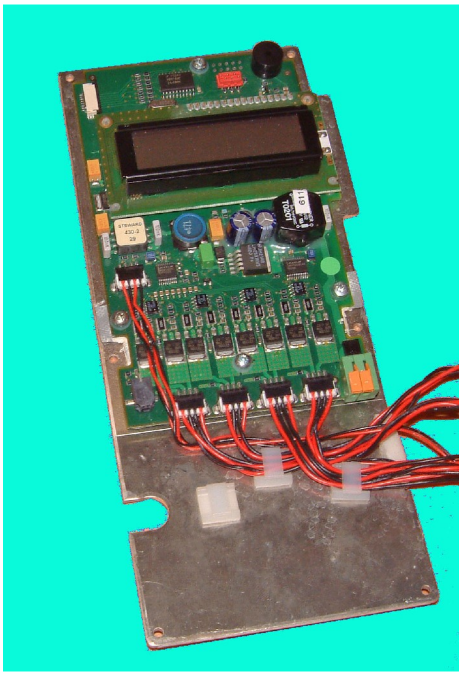

Title Curelight 128
No. 11125 - SCH002069
Rev. G
Date 9-Oct-2006
Sheet no. 1 of 2
Drawn by TOJ
Time 14:38:38
Authorized by
Client PhotoCure
Designed by
Kitron Development
ATMEGA32L-8AU
LCD
TERMINAL STRIPS
FP CONNECTOR
Programming plug
LED driver
TRANSDUCER
PLATED_HOLE
Enclosure temp. sensor
Close to U3
Close to P4
PWR
FAN


Title LED driver
No. 11125 - SCH002069
Rev. G
Date 9-Oct-2006
Sheet no. 2 of 2
Time 14:38:38
Drawn by
Authorized by
Client PhotoCure
Designed by
Kitron Development
Q100 IRFR120
Q101 IRFR120
Q102 IRFR120
Q103 IRFR120
Q104 IRFR120
Q105 IRFR120
Q106 IRFR120
Q107 IRFR120
U100A LM2904
U100B LM2904
U101A LM2904
U101B LM2904
U102A LM2904
U102B LM2904
U103A LM2904
U103B LM2904
P6 2-179123-4
P7 2-179123-4
P8 2-179123-4
P9 2-179123-4
HEAT1
HEAT3
HEAT5
HEAT7
LED1 CTRL
LED1 SENSE
LED2 CTRL
LED2 SENSE
LED3 CTRL
LED3 SENSE
LED4 CTRL
LED4 SENSE
LED5 CTRL
LED5 SENSE
LED6 CTRL
LED6 SENSE
LED7 CTRL
LED7 SENSE
LED8 CTRL
LED8 SENSE
Close to U104
+26mV
+12V
+48V
GND
U104 MAX148
U106 MAX521
NTC_10k
TEMP_12
TEMP_34
TEMP_56
TEMP_78
Close to U1
MISO
MOSI
SCK
SSTEB
ADCS
I2C_SCL
I2C_SDA
L100 10u/0.15A
L101 10u/0.15A
U105 LM385-1.2
+5V_uC



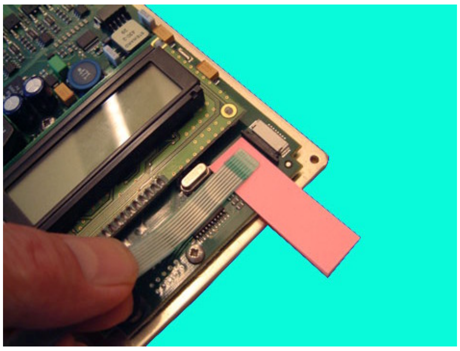
Step 19

If you change the electronics, the DC input cable and flat keypad cable has to be disconnected.



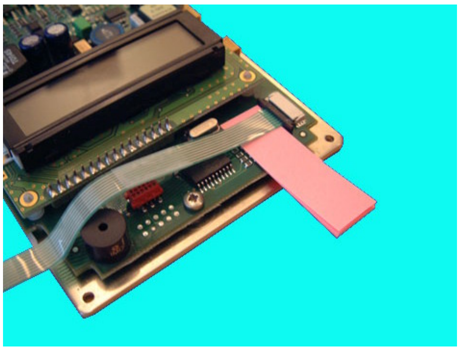
Step 20

- DC cable (+) is at the right most position
- The cable is marked with a (1) sign
- The fan connector can be seen to the left most position



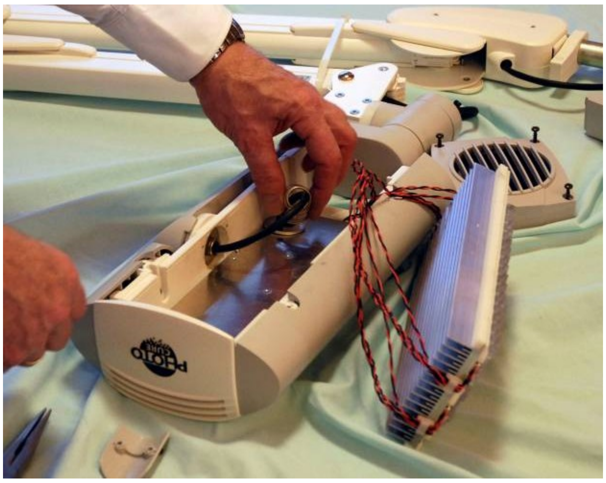
Step 21

It is easier to engage the flat cable to the connector receptacle by having a 0.5 mm spacer underneath.



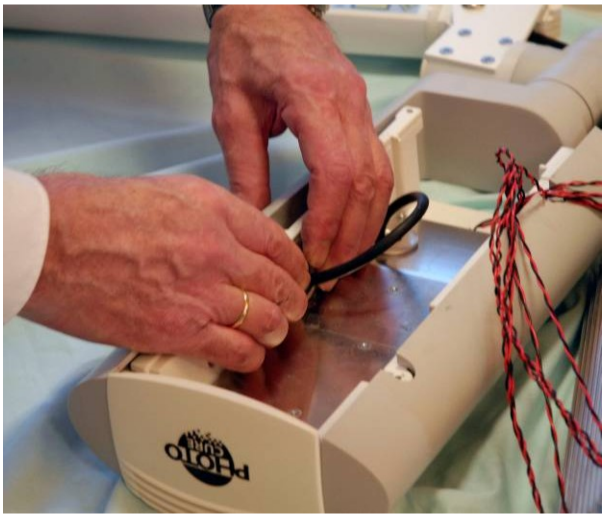
Step 22

You can use a very small flat pair of pliers to engage the cable.



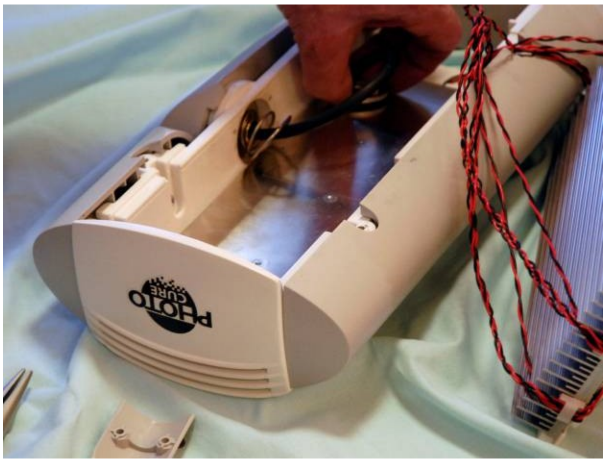
Step 23
Step 23 – 30 is only relevant if you have changed the housing or main arm.

Put back on the washers and spring.



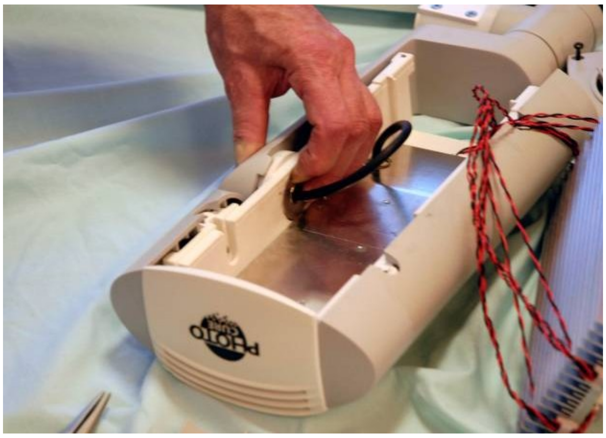
Step 24
Step 23 – 30 is only relevant if you have changed the housing or main arm.

The last washer must be properly seated into the hole.



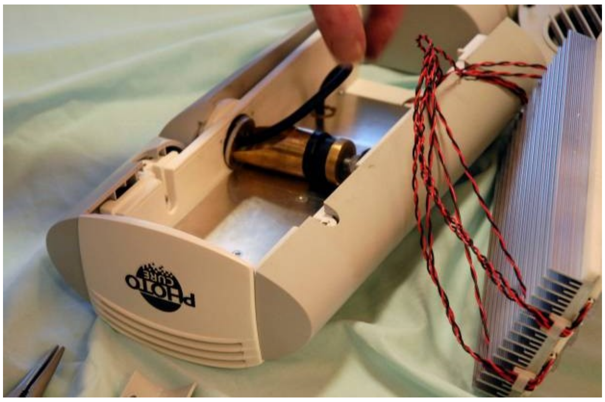
Step 25
Step 23 – 30 is only relevant if you have changed the housing or main arm.

You have to get the washer well inside the hole or else it will not fit on to the axle.



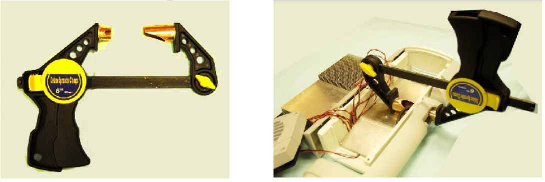
Step 26
Step 23 – 30 is only relevant if you have changed the housing or main arm.

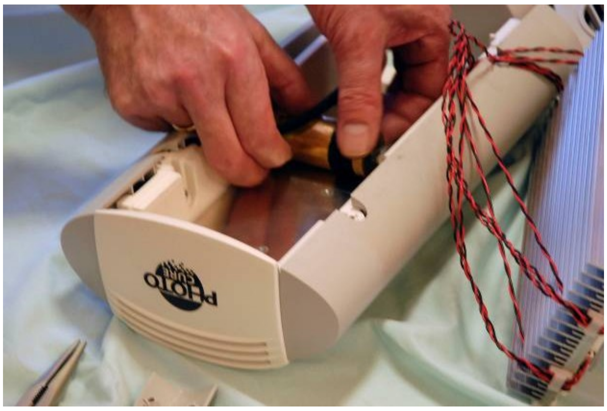
Test that the washer fits on to the axle.



Step 27
Step 23 – 30 is only relevant if you have changed the housing or main arm.

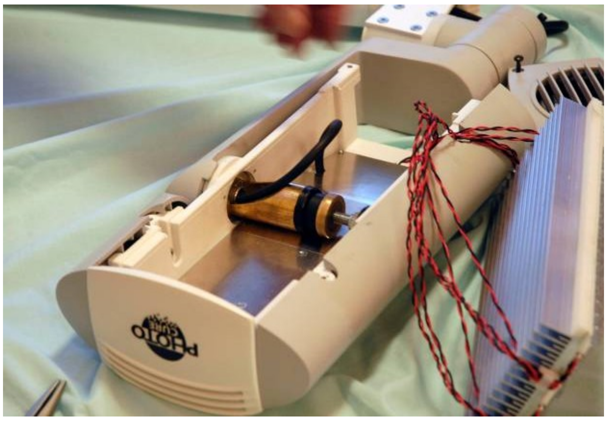
Use a tool to compress the spring mechanism. (The tool may look different to the one on the picture)
A modified clamp can also be used.





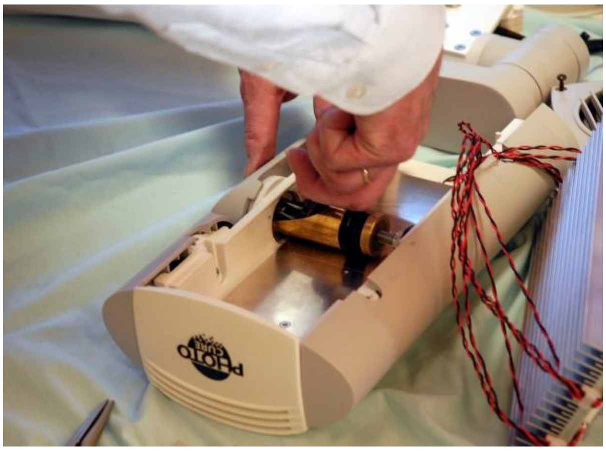
Step 28
Step 23 – 30 is only relevant if you have changed the housing or main arm.

Compressing the spring by turning the rotary wheel on the tool clock-wise.



Step 29
Step 23 – 30 is only relevant if you have changed the housing or main arm.

The circlip can now be engaged on the main arm axle.

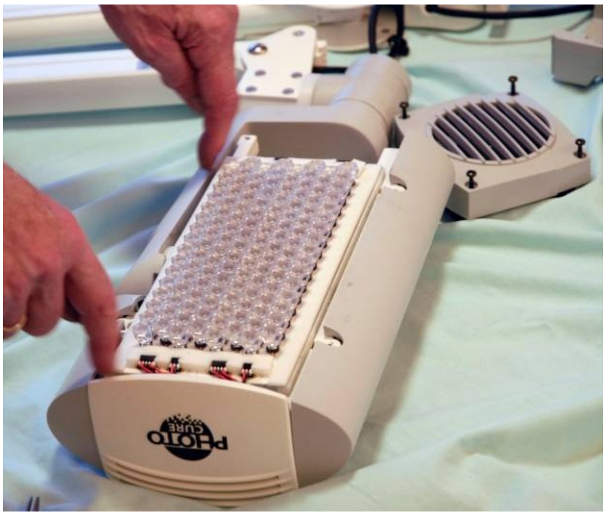


Step 30

Step 23 – 30 is only relevant if you have changed the housing or main arm.

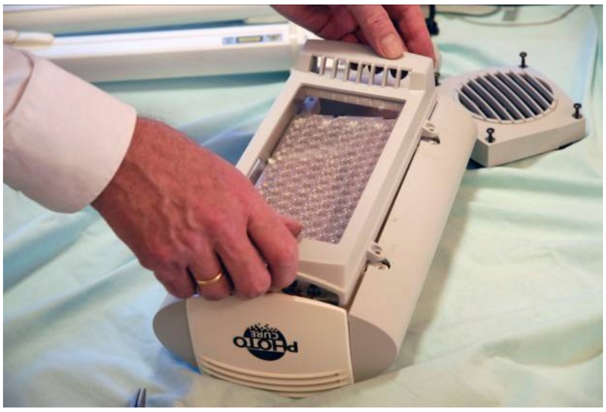
Make sure that the circlip is properly engaged in the groove.

This is very important.
The main arm my fall of and heart the patient if this is not done properly.



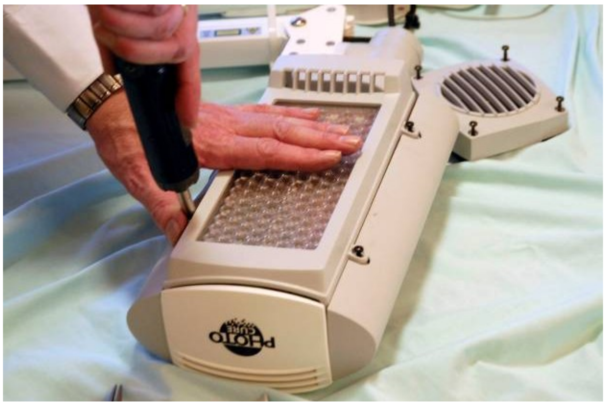
Step 31

Place the light module back on the housing.
You can see the positioning marks on the housing.



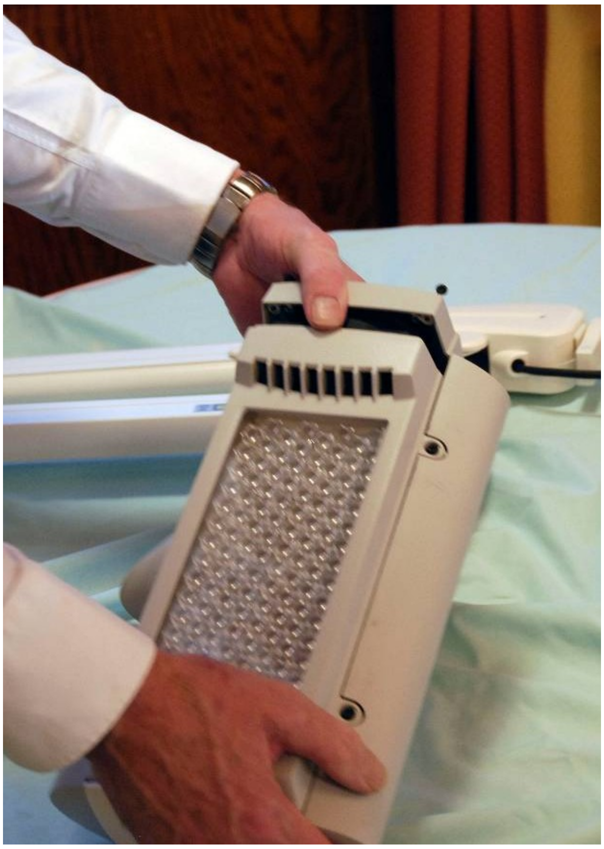
Step 32

Position the housing bottom.



Step 33

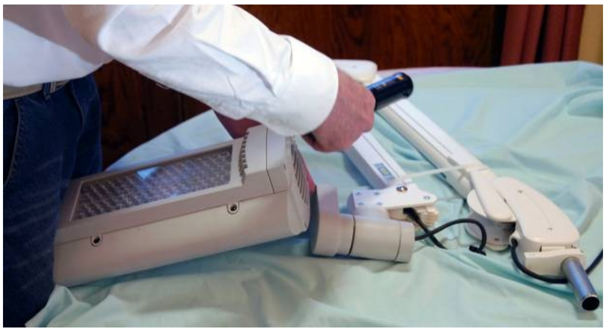
Mount back the 4 Torx 20 screws.



Step 34

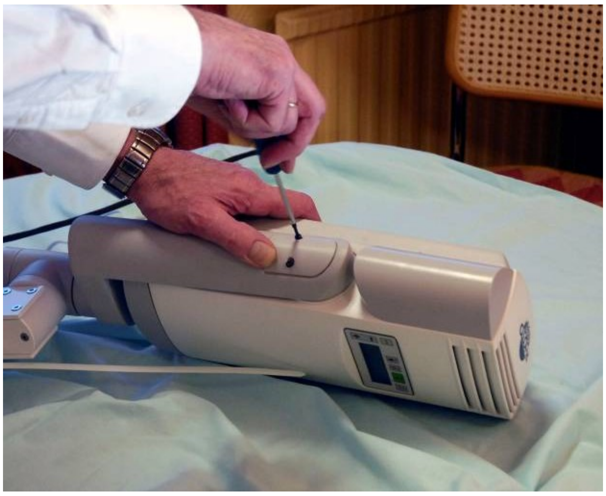
Put back the fan and cover.

Make sure that the fan wires are not hitting the fan blade.



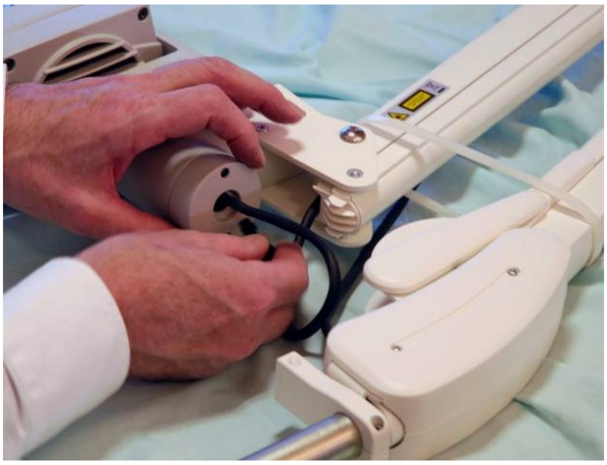
Step 35

Fasten the fan with the 4 Torx 20 screws.



Step 36

Tighten up the cord and put on the side cover using the T10 screwdriver.

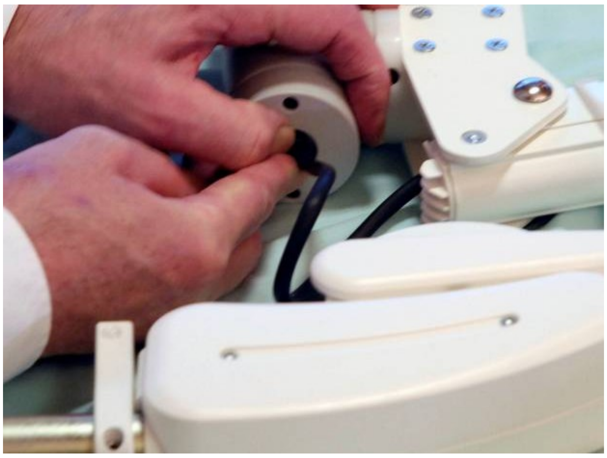


Step 37

Put on the strain relief.

For lamps with detachable lamp head:

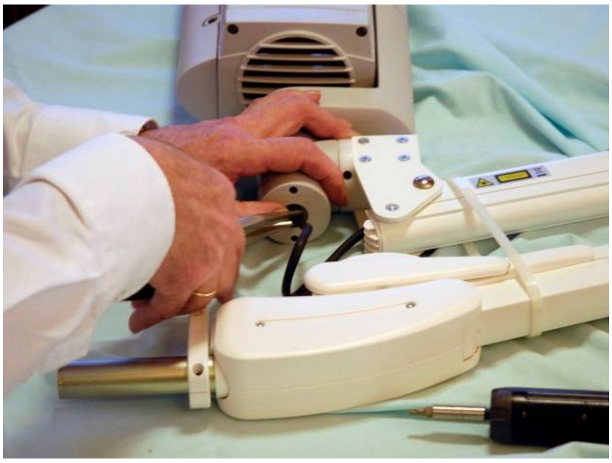
Place the lamp head in the lamp head holder on the parallel arm and secure the connection with the locking screw using the provided Allen key. Connect the cable plug in the T-piece cover plug.



Step 38

Position the strain relief into the hole in the cap.

Not applicable for lamps with detachable lamp head



Step 39

Use a pair of telephone pliers for the final assembly of the strain relief.

Not applicable for lamps with detachable lamp head

Step 40

After final assembly, test that the lamp is functioning OK and that nothing is obstructing the fan.

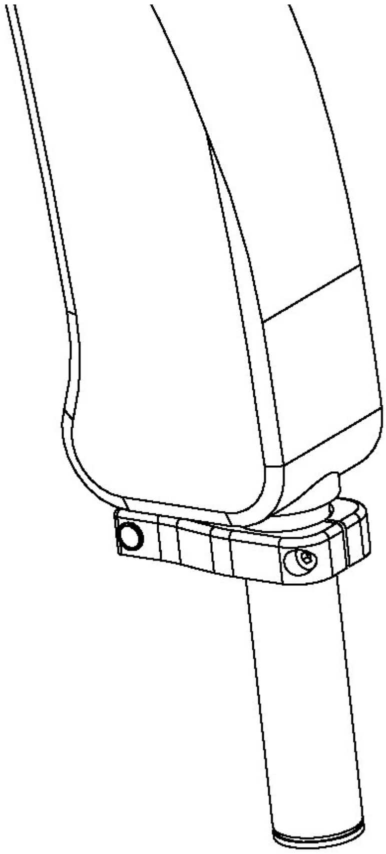
This is done by:
- Attaching power to the lamp and pressing the start button on the display panel.
- After self test is over, press start again to start the lamp. Do not stair into the light.
- Press stop after a few seconds of operation to stop the lamp.

If the repairs are done to the light module or electronics the lamp has to be fully tested according to test specifications. *Ref. Instructions in PCU-009-128.*

1.10 Stop block module (TS1-0-250) assembly

Required items

Part #	# of items	Description
128-1-223	1	Parallel arm
TS1-1-250	1	Stop block module



Assembly description

Step 1) Fit the stop block module onto the shaft of the parallel arm. **Assure that the tap on the stop plate points upwards and engages with the slot on the parallel arm.** Use a hammer and a purpose-made cylinder over the shaft to knock the stop block module into place. The gap between the arm and the stop block module should be as little as possible and no more than 1 mm.

Step 2) Secure the stop plate by tightening the S3 Allen screw to a torque of 3.0 Nm using a torque driver.

1.11 Lamp including parallel arm assembly

1.11.1 Fixed lamp head (128-0-250)

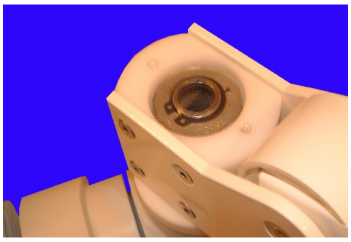
Required items

Part #	# of items	Description
128-0-200	1	Lamp head module
128-0-210	1	Parallel arm with lamp head holder unit
128-1-216	1	Friction pad
128-0-213	1	Spring unit
128-1-937	1	Screw – Set screw M8x12
128-1-942	1	Aluminium washer
128-1-916	1	Circlip
128-1-211	1	Cover – Lamp head holder unit
128-1-936	2	Screws – M4x10 countersunk
128-1-261	1	Receptacle Body (Bayonet plug)
128-1-136	1	Label Power Plug
128-1-956		Loctite 243 glue

Assembly description

Step 1) Insert the friction pad (128-1-216) in the lamp head holder unit of the parallel arm (128-0-210).

Step 2) Slide the vertical axle of the lamp head module (128-0-200) into the lamp head holder unit of the parallel arm (128-0-210).



Step 3) Slide the aluminium washer (128-1-942) onto the vertical axle.

Step 4) Assemble the circlip (128-1-916) onto the vertical axle. Make sure that the circlip is fully engaged in the groove on the axle.

Step 5) Insert the spring unit (128-0-213) into the lamp head holder unit of the parallel arm (128-0-210).

Step 6) Assemble the M6x12 set screw (128-1-937) into the lamp head holder unit of the parallel arm (128-0-210). Tighten until the friction in the vertical axle is appropriate.

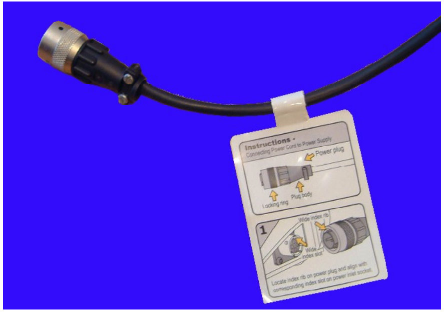
Step 7) Assemble the cover (128-1-211) onto the lamp head holder unit of the parallel arm (128-0-210) using the two countersunk M4x10 screws (128-1-936).

Step 8) Pull the power cable (128-1-302) from the lamp head module (128-0-200) thru the parallel arm (128-0-210). Leave about 10 cm of slack on the cable between the lamp head module (128-0-200) and the parallel arm (128-0-210). (So the cable doesn’t get stretched at the extreme positions of the lamp head.)

Step 9) Put the stain relief onto the DC power cable. Put on the male crimp pins using the specially made crimping tool. Put the cord numbered 1 into "D" [+] in the bayonet plug, and the pin with cord marked 2 in "B" [-] in the bayonet plug. If you make a mistake, you can use the specially made extractor tool to release the pins from the bayonet plug again.

Step 10) Put a drop of Loctite 243 on the threads at the strain relieve threads and screw the strain relief to the bayonet plug. Secure the lead with the cross bar and two self threading screws.

Step 11) Remove the protective paper from the backside of the Label Power Plug (128-1-136) and attach the label to the cord, next to the bayonet plug (see picture below).

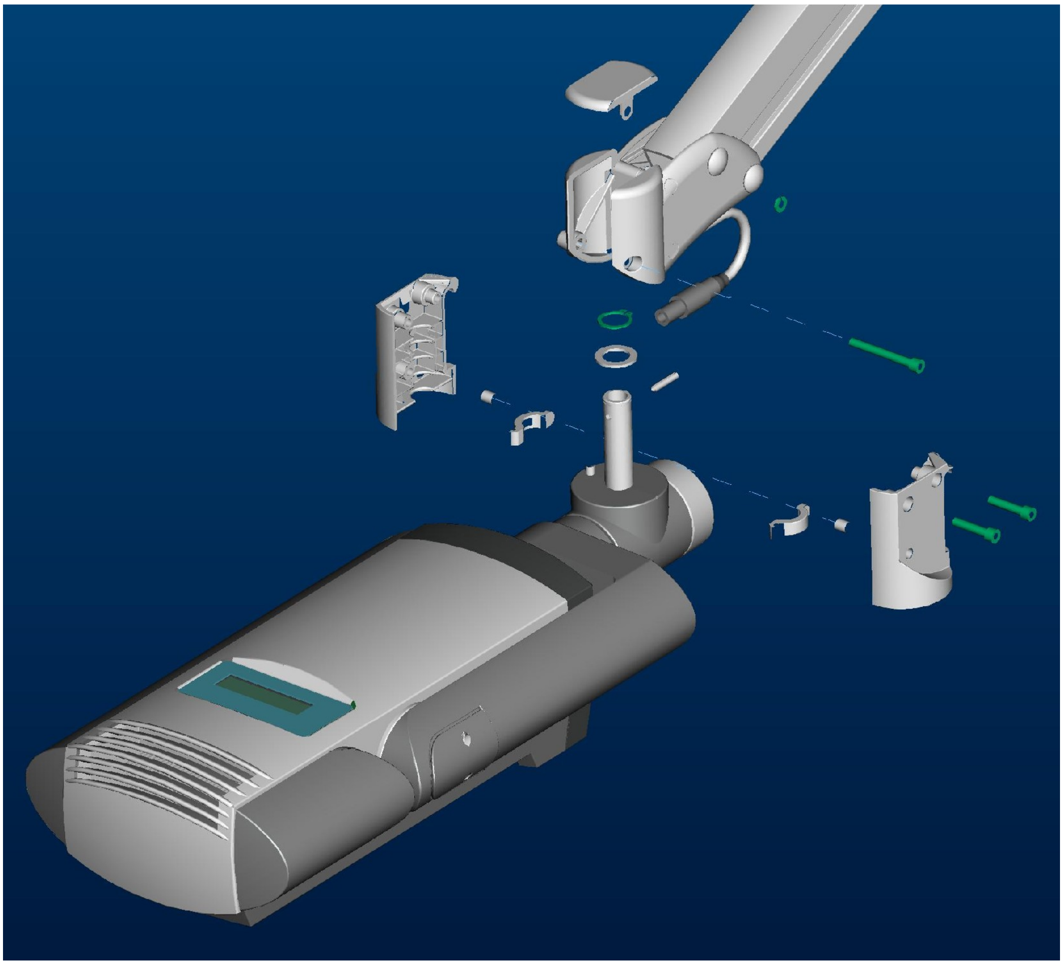

Instructions -
Connecting Power Cord to Power Supply
Power plug
Locking ring
Plug body
1
Wide index rib
Wide index slot
Locate index rib on power plug and align with corresponding index slot on power inlet socket.

NB! Use new stronger plug Souriau UTS 6JC104P for repaired lamps, ref Chapter 2

1.11.2 Detachable lamp head (128-0-252)

Required items

Part #	# of items	Description
128-0-200	1	Lamp head module
128-0-212	1	Parallel arm with lamp head holder unit
128-1-959	1	Lamp head holder inner right
128-1-960	1	Lamp head holder inner left
128-1-963	1	Lamp head holder top cover
128-1-964	2	Break shoe
128-1-974	2	Break pad spring
128-1-973	2	Umbraco screw DIN912 M5×25
128-1-975	2	Hexagonal nut DIN934 M5
128-1-972	1	Spring lock washer DIN127A M5
128-1-976	1	Teflon-bronze washer (Frimet)
128-1-977	1	Security pin DIN1481 Ø4×20
128-1-980	1	Umbraco screw DIN912 M5×45
128-1-916	1	Circlip
128-1-263	2	Crimp pin
128-1-956	1	Loctite 243 glue
128-1-991	1	Plug UTS6JC104P
128-1-136	1	Label Power Plug



Assembly description

Step 1) Assemble chronologically the security pin (128-1-977), teflon washer (128-1-976) and circlip (128-1-916) onto the T-piece (128-0-437) vertical axle. Make sure that the circlip is fully engaged in the groove on the axle.

Step 2) Insert break shoe (128-1-964) and spring (128-1-974) in both inner lamp head holders (128-1-959 and 128-1-960). The orientation of the break shoe is given by a small recess in the inner lamp head holder for the spring to rest against

Step 3) Assemble the inner lamp head holders (128-1-959 and 128-1-960) onto the T-piece (128-0-437) vertical axle and secure them using the two M5×25 umbraco screws (128-1-973) and corresponding nuts (128-1-975)

NOTE: The parallel arm shall be secured with the attached strap to avoid the parallel arm to open uncontrolled. There are very strong springs inside the parallel arm that can cause serious damage when the lamp head is not installed.

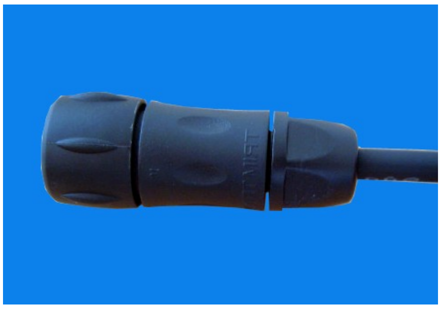
Step 4) Assemble the lamp head module (128-0-200) by position the inner lamp head holder to the outer lamp head holder on the parallel arm (128-0-212). Secure the position by installing the spring lock washer (128-1-972) and the M5×45 umbraco screw (128-1-980) through both inner and outer lamp head holders.

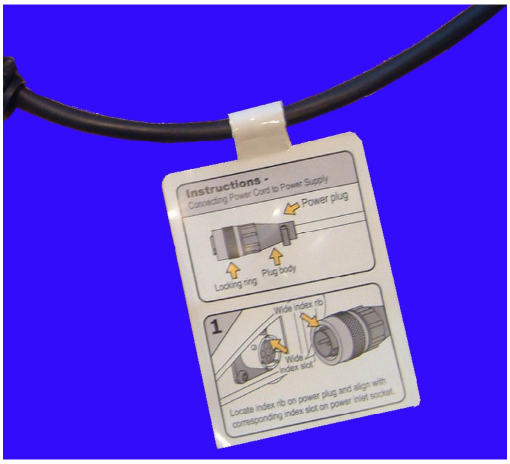
Step 5) Assemble the top cover (128-1-963) onto the lamp head holder by pressing it down in position. Note that the cover shall be installed with the knobs located on the inside of the cover at the lamp head side, i.e. away from the parallel arm.

Step 6) Put the stain relief onto the DC power cable. Put on the male crimp pins using the specially made crimping tool. Put the cord numbered 1 into "D" [+] in the bajonet plug, and the pin with cord marked 2 in "B" [-] in the bajonet plug. If you make a mistake, you can use the specially made extractor tool to release the pins from the bajonet plug again.

Step 7) Put a drop of Locktite 243 (128-1-956) on the threads at the strain relief and screw the strain relief to the bajonet plug.

Step 8) Remove the protective paper from the backside of the Label Power Plug (128-1-136) and attach the label to the cord, next to the bajonet plug (see picture below).




Instructions -
Connecting Power Cord to Power Supply
Power plug
Locking ring
Plug body
1
Wide index rib
Wide index slot
Locate index rib on power plug and align with corresponding index slot on power inlet socket.

1.12 Parallel arm with lamp head holder unit assembly

1.12.1 Fixed lamp head (128-0-210)

Required items

Part #	# of items	Description
128-1-223	1	Parallel arm
128-1-220	1	Bracket
128-1-221	1	Side plate R
128-1-222	1	Side plate L
128-1-943	4	Bushings
128-1-939	8	Screws – PT-5 x 12 mm
128-1-940	4	Starlocks Caps BV 6666-03C

Assembly description

Step 1) Screw one side plate R (128-1-221) to the bracket (128-1-220) using 4 PT screws . Assure that the bracket has the right orientation, refer to drawing.

Step 2) Put the bushings (128-1-943) in the holes in both side plates.

Step 3) Assemble the bracket with the side plate to the parallel arm; assuring that the axles from the parallel arm enters the bushings.

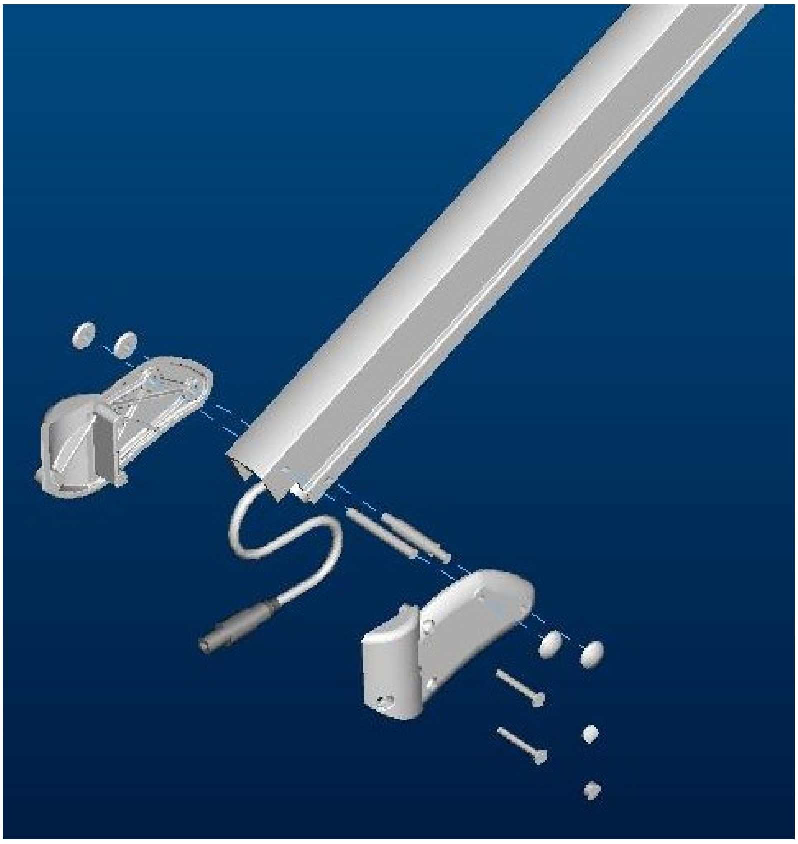
Step 4) Assemble the side plate L (128-1-222) to the bracket, so that the bushing enters the axle on the parallel arm. Screw it to the bracket using 4 PT screws.

Step 5) Secure the two 52 x 6 mm pin bolts going through the side plates R and L with Starlock Caps on both sides. Use a plastic hammer to prevent the Caps to be damaged.

1.12.2 Detachable lamp head (128-0-212)

Required Items

Part #	# of items	Description
128-1-223	1	Parallel arm
128-1-961	1	Lamp head holder outer right
128-1-962	1	Lamp head holder outer left
128-1-968	1	Pinbolt upper
128-1-969	1	Pinbolt lower
128-1-965	1	Screw cap for top screw
128-1-966	1	Screw cap for bottom screw
128-1-967	2	Screw – PT-K 40x35
128-1-940	4	Starlock Caps BV 6666-03C
128-0-989	1	Cable from PS unit to lamp head connector



Assembly description

Step 1) Position the power cable (128-0-989) in the parallel arm (128-1-223) with the installed male connector at the lamp head side. The power cable shall be positioned with sufficient slack (approx. 15cm) on the lamp head side to avoid the cable to get stretched at the extreme positions of the lamp head.

Step 2) Install the upper (128-1-968) and lower (128-1-969) pinbolt in the respective holes in the parallel arm.

Step 3) Assemble the right (128-1-961) and left (128-1-962) lamp head holders in the pinbolts and secure the position with the four starlock caps (128-1-940). Avoid damage to the starlocks.

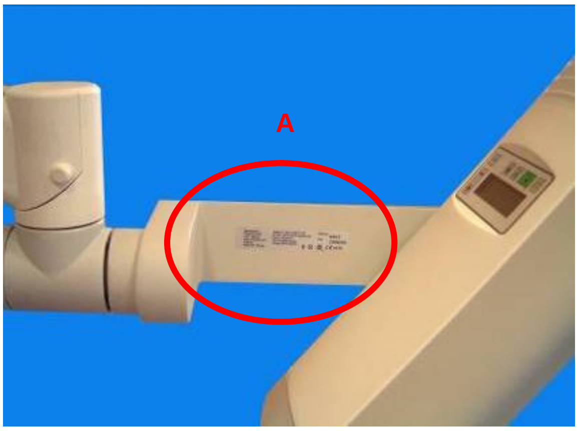
Step 4) Screw the two PT-K 40x35 (128-1-967) through the holes in the outer right lamp head holder (128-1-961).

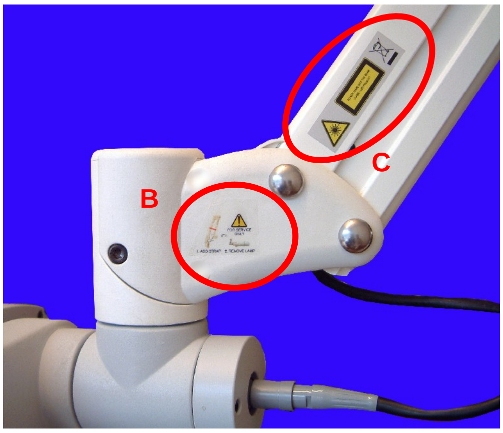
Step 5) Assemble the upper (128-1-965) and lower (128-1-966) screw cap.

1.13 Labels placement description

Required items

Part #	# of items	Description
128-0-250	1	Lamp including parallel arm
128-1-138	1	Label Serial Number
128-1-142	1	Label Warning and Special Waste
128-1-146	1	Label Detachable Lamp Head Warning *Only applicable for lamps with detachable lamp head*





Assembly description

Step 1) Place the labels according to the pictures above:

- Product label with Serial no. and manufacturing date on the inside of the positioning arm (ref. position A)
- Label Warning and Special Waste on the left side of the parallel arm, near the lamp head (ref. position C)
- Label Detachable Lamp Head Warning on the left lamp head holder (ref. position B)
  Only applicable for lamps with detachable lamp head

2 Replacing the DC Power Plug

Assembly description

Step 1) Dismantle the existing plug (128-1-261) by removing the two self threading screws for the cross bar. Unscrew the strain relieve from the plug. Use the specially made extractor tool to release the pins from the bajonet plug.

Step 2) Put the stain relief for the new plug (128-1-991) onto the DC power cable. Put on the male crimp pins using the specially made crimping tool. Put the cord numbered 1 into "D" [+] in the bayonet plug, and the pin with cord marked 2 in "B" [–] in the bayonet plug. If you make a mistake, you can use the specially made extractor tool to release the pins from the bayonet plug again.

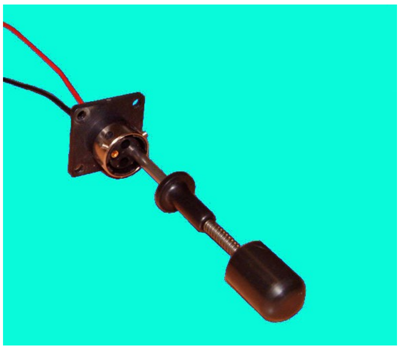
Step 3) Put a drop of Loctite on the threads at the strain relief threads and screw the strain relief to the bayonet plug.

Step 4) Double check:

Cord marked 1 into "D" [+ or red]
Cord marked 2 into "B" [– or black]

Step 5) If you have a CL16 power supply available when you perform the plug replacement on the CL128, you can use this to test that you have the right polarity. You will not be able to run the lamp with full light, but you can start the lamp and see that the menu switches on when you push the start button. The CL16 supply is not powerful enough to harm the lamp in any way, but the CL128 power supply will damage the protection circuit of the lamp if the wrong polarity is used. If the test is OK, switch over to the CL128 power supply.

New plug



Extractor tool

The plug may look slightly different from the above picture. It also comes with a silver ring in the front instead of black.

To use the extractor tool, press the tool firmly into the connector by holding the centrepiece of the tool, and continue to press onto the top piece.

If wires have to be reconnected to the pins, it is recommended to solder them on, as otherwise this requires special crimping tools.

- Part number for the Souriau UTS 6JC104P plug is 128-1-991 with pins (extra) 128-1-263 (RM16M23K)
- Part number for the wall mounted connector is 128-1-323 Souriau UTO 0104SH with mating pins 128-1-345 (RC16M23K)

3 Assembly of Aktilite CL128 Power Supply

3.1 Material/Equipment

Tools needed for the assembly of the Aktilite CL128 Power Supply

Required tools

# of items	Description
1	Screwdriver, Pozidrive 2 – Tool A
1	Screwdriver, Torx 10 – Tool B
1	Screwdriver, Torx 20 – Tool C
1	Paint removing tool (drill or grinder) – Tool D

3.2 PS electronics module (128-0-330) assembly

Required items

Part #	# of items	Description
128-1-331	1	PS electronics Tested to medical std. and adjusted by Kitron
128-0-332	1	Cable A – Blue AC conductor
128-0-333	1	Cable B – Brown AC conductor
128-0-334	1	Cable C – Green/yellow ground cable
128-0-335	1	Cable D – Red DC cable
128-0-336	1	Cable E – Black DC cable
128-1-337	1	Ferrite (for the load cables)
		Tool A - Screwdriver, pozidrive 2

Assembly description

Step 1) Assemble the cables A (128-0-332), B (128-0-333) and C (128-0-334) to the power supply electronics (128-1-331), by using Tool A. Cable A (blue) is connected to the terminal marked N, Cable B (brown) is connected to the terminal marked L, and Cable C (green/yellow) is connected to the terminal marked with the ground symbol. Bend the three cable shoes to a 45 degree angle upwards when the electronics lies flat on the table.

Step 2) Assemble the cables D (128-0-335) and E (128-0-336) to the power supply electronics, by using Tool A. Cable D is connected to terminal 1, and cable E is connected to terminal 4.

Step 3) Thread both load cables (Cables D and E) through the ferrite (128-1-337) 5 times.

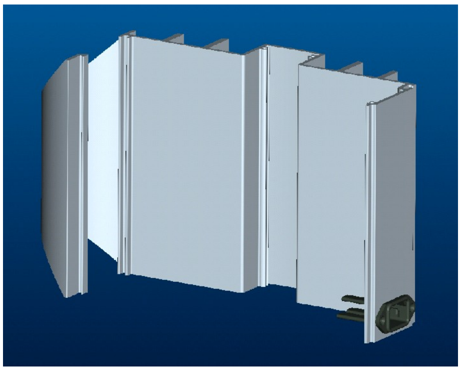
Step 4) Make sure that the 7 cable terminal screws are securely tightened.

Step 5) Remove the two printed forms that are tucked between some components on the power supply electronics. Save them for marking of the complete unit and the Device History Record.

3.3 PS housing module A (128-0-310) assembly

Required items

Part #	# of items	Description
128-1-311	1	PS housing profile, type A
128-1-312	1	AC power inlet plug
128-1-313	2	Screws – PT3x10 wn1553K30x10
		Tool B, screwdriver Torx 10



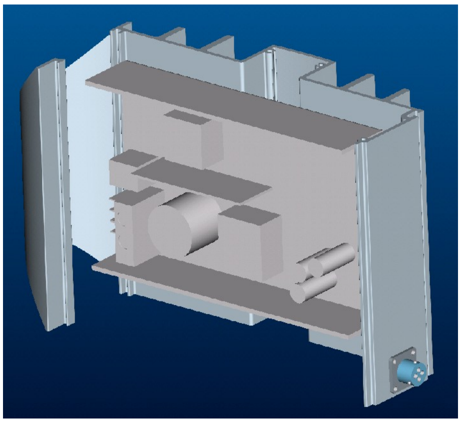
Assembly description

Step 1) Assemble the AC power inlet plug (128-1-312) onto the PS housing profile, type B (128-1-311), with the 2 screws (128-1-313). Make sure it is fastened in the correct position, with the central pin facing upwards. Use Tool B.

3.4 PS housing module B (128-0-320) assembly

Required items

Part #	# of items	Description
128-1-321	1	Power supply housing profile, type B
128-1-323	1	DC power outlet plug
128-1-324	4	Screws – PT 3x8 pan head
128-0-330	1	Power supply electronics module
128-1-322	4	Screws M4x10 countersunk
		Tool B, screwdriver Torx 10
		Tool C, screwdriver Torx 20



Assembly description

Step 1) Assemble the DC power outlet plug (128-1-323) onto the PS housing profile B (128-1-321), with the 4 button head PT-DG screws (128-1-324). Make sure it is fastened in the correct position, with one of the 3 locking pins facing upwards. Use Tool B.

Step 2) Remove the paint from two of the 4 holes in the PS housing profile B, for assembling the PS electronics module, to ensure electric contact between the M4 screw and the PS housing profile B. Use Tool D.

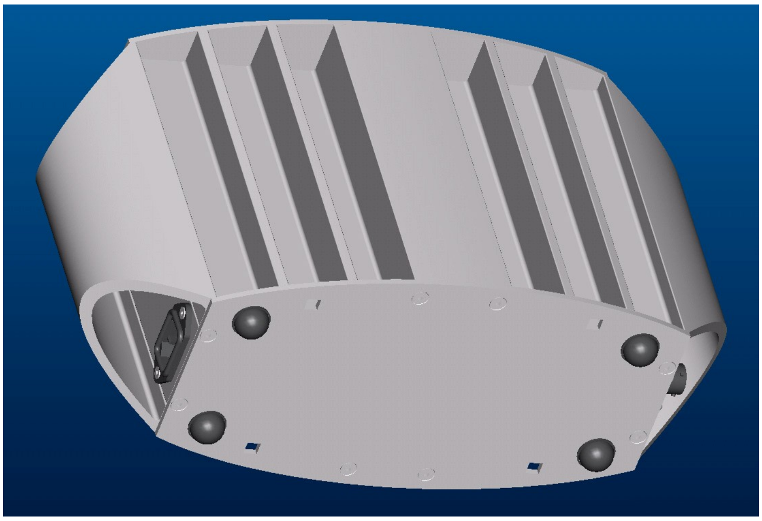
Step 3) Assemble the PS electronics module (128-0-330) onto the PS housing profile, type B (128-1-321), with the 4 screws (128-1-322). Make sure that the red and black load cables are on the same side of the profile as the power outlet plug. Use the Use Tool C.

Step 4) Plug the red and black load cables into the correct holes in the power outlet plug. The red load cable (+) goes into the slot marked D, and the black load cable (-) goes into the slot marked B.

3.5 Power supply (128-0-300) assembly

Required items

Part #	# of items	Description
128-0-320	1	PS housing module B
128-0-310	1	PS housing module A
128-1-301	1	PS housing top cover
128-1-302	1	PS housing bottom cover
128-1-306	16	Countersunk screws 4.2x19
128-1-307	4	Rubber pads (self adhesive)
128-1-309	1	Label on side wall of power supply
		Strip, glue or other suitable means of fixing the ferrite to the PS electronics metal casing.
		Tool C screwdriver Torx T20
		Tool D, paint removing tool (drill or grinder)



Assembly description

Step 1) Put the PS housing module B (128-0-320) upside down on the table. Slide the PS housing module A (128-0-310) gently into module B. Make sure that all 4 grooves engage. Make sure that the three power inlet cables are reachable.

Step 2) Connect the three AC power inlet cables to the AC power inlet plug. Make sure that the cables are correctly connected, blue cable to the tongue marked N, brown cable to the metal tongue marked L, and the green/yellow cable to the metal tongue marked with the ground symbol.

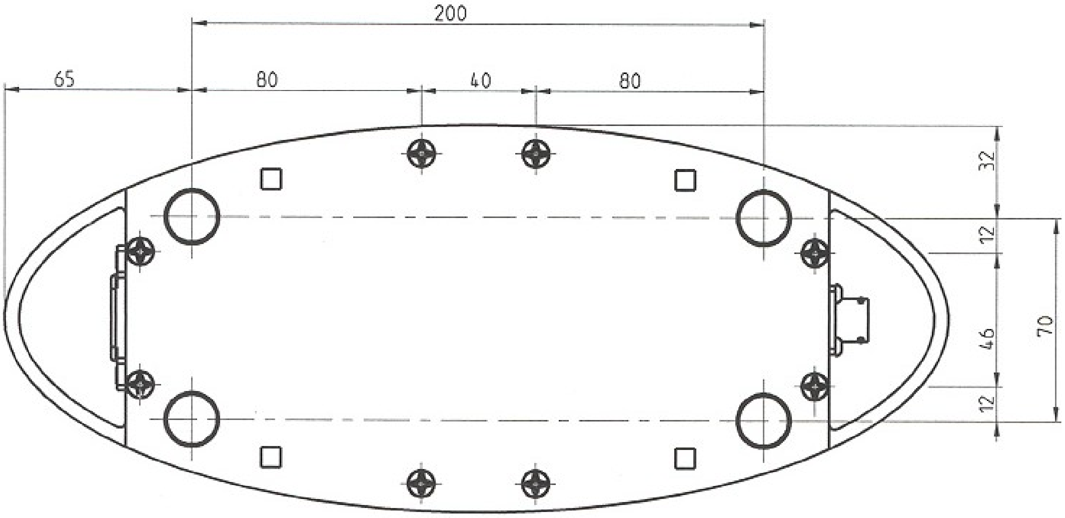
Step 3) See that the voltage can be adjusted to more than 51.2 Volts and then adjust the voltage down again to 50.4 Volts by means of a thin screwdriver according to TCU-002-128. If the power supply cannot be adjusted to 51.2 V or more, the power supply should be rejected.

Step 4) Fix the ferrite to the PS electronics' metal casing with a strip, silicone or other means. There are two holes in the PS electronics' metal casing, suitable for this.

Step 5) Remove the paint from two of the 8 holes in each of the PS housing end covers, to ensure electric contact between the PT-DG screw and the PS housing profiles. Use Tool D

Step 6) Assemble one PS housing top cover (128-1-301) with the PT-DG screws (128-1-306). Make sure that the two housing modules are aligned before inserting the two screws that engage with both modules. These two screws may be left until the other 6 screws are tightened. Ensure electric contact between the end covers and one of the housing modules.

Step 7) Assemble the other power supply end cover (128-1-301).

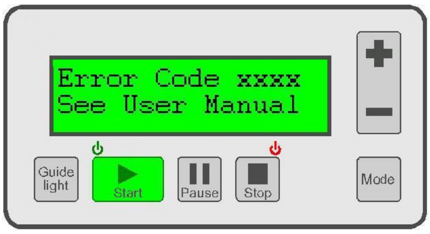


Step 8) Place the four rubber pads (128-1-307) on the lower PS housing end cover, as shown on the picture above.

Step 9) Apply label (128-1-309) to the Power Supply side wall.

4 Error Codes

The Aktilite CL128 has in-built monitoring features. If an error should occur, the display will show the following message and five rapid beeps will be heard:


Error Code xxxx
See User Manual

If an error code is displayed, or if any other unexpected condition occurs (e.g. lamp does not operate), the following steps should be taken:

1. **Disconnect the mains cable for at least 20 seconds**
2. **Reconnect the mains cable**
3. **Check all cables and connections**
4. **Switch on and check if the lamp can be used as normal**
5. **If the error persists, refer to the table below**

Aktilite CL128 Error Codes

NOTE: Refer to the instructions above before using the table

Error Code	Possible Causes	Description
1101	Device internal error	POST FLASH (Program memory) error.
1102	Device internal error	POST EEPROM (System parameters) error.
1103	Device internal error	POST RAM (Static memory) error.
1104	Key was pressed during switch-on self-test or Device internal error	POST key stuck error.
1105	Device internal error	POST too low enclosure temperature error.
1107	Device internal error	POST too low LED driver temperature error.
1109	Device internal error	POST too big variation LED driver temperatures error.
1110	Device internal error	POST too low LED array temperature error.
1112	Device internal error	POST too big variation LED array temperatures error.
1117	The lamp has reached the maximum allowed number of illumination hours.	Need to recalibrate or replace the light source.
1206	Obstruction of cooling air inlet/outlet or Device internal error	POST too high enclosure temperature error.
1208	Obstruction of cooling air inlet/outlet or Device internal error	POST too high LED driver temperature error.
1211	Obstruction of cooling air inlet/outlet or Device internal error	POST to high LED array temperature error.
2105	Device internal error	Self-test too low enclosure temperature error.
2107	Device internal error	Self-test too low LED driver temperature error.
2109	Device internal error	Self-test too big variation LED driver temperatures error.
2110	Device internal error	Self-test too low LED array temperature error.
2112	Device internal error	Self-test too big variation LED driver temperatures error.
2206	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high enclosure temperature error.
2208	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high LED driver temperature error.
2211	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high LED array temperature error.
2213	Device internal error	Self-test watchdog error. The software has been restarted.
2214	Device internal error	Self-test too high LED current for OFF mode.
2215	Device internal error	Self-test too high LED current for GUIDE LIGHT mode.
2216	Device internal error	Self-test too high or too low LED current for FULL LIGHT mode.